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Number 5



COOPER ORNITHOLOGICAL CLUB

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THE NESTING OF THE SPOTTED OWL

By DONALD R. DICKEY

WITH SEVEN PHOTOS BY THE AUTHOR

WE HAD BEEN prospecting for a rumored condor ledge high in the coast mountains of Ventura County, California, and had come at night to a little valley where horse feed grew close to a clear, cold spring. It was an ideal camp site, and we left it with real regret as the early sun first began to creep down the western wall of the canyon on the memorable morning of May 15, 1913. In the bottoms it was still cold and damp, but as we climbed we slowly left behind the chill of the dark, sweet-smelling bays and the shade of the alder fringe along the creek, and came out into the open and warmth of the pines.

The saddle of the range which we were crossing was, roughly speaking, five thousand feet above the sea, so there was much to interest an eye and ear trained in the lowlands: here a fleshy crimson snow-plant, there a blue-fronted jay, so much the superior of our crestless, nest-robbing sneak of the lower live-oak valleys; or, perhaps, a slender-billed nuthatch "yanking" among the scattered oaks, or a friendly Bailey chickadee.

Once again the trail led into the shadow. This time at the foot of a high, overhanging cliff of red conglomerate, weathered out into fantastic castellated shapes. The pack horse was leading like a lamb for once in his aggravating career, so with leg flung across the saddle horn I had nothing to do but swing with the stride of old "Powhatan", and let my eyes wander eagerly over cliff face and tree.

Suddenly, in the black mouth of a pot-hole high on the rock wall, I caught a glimpse of a large round head. Almost instantly the bird shrank back into the dark interior, but the glimpse had satisfied me that I had seen my first Spotted Owl (*Strix occidentalis occidentalis*)! Man may voluntarily have come to the ground with greater speed than mine in that instant, but I doubt it. The

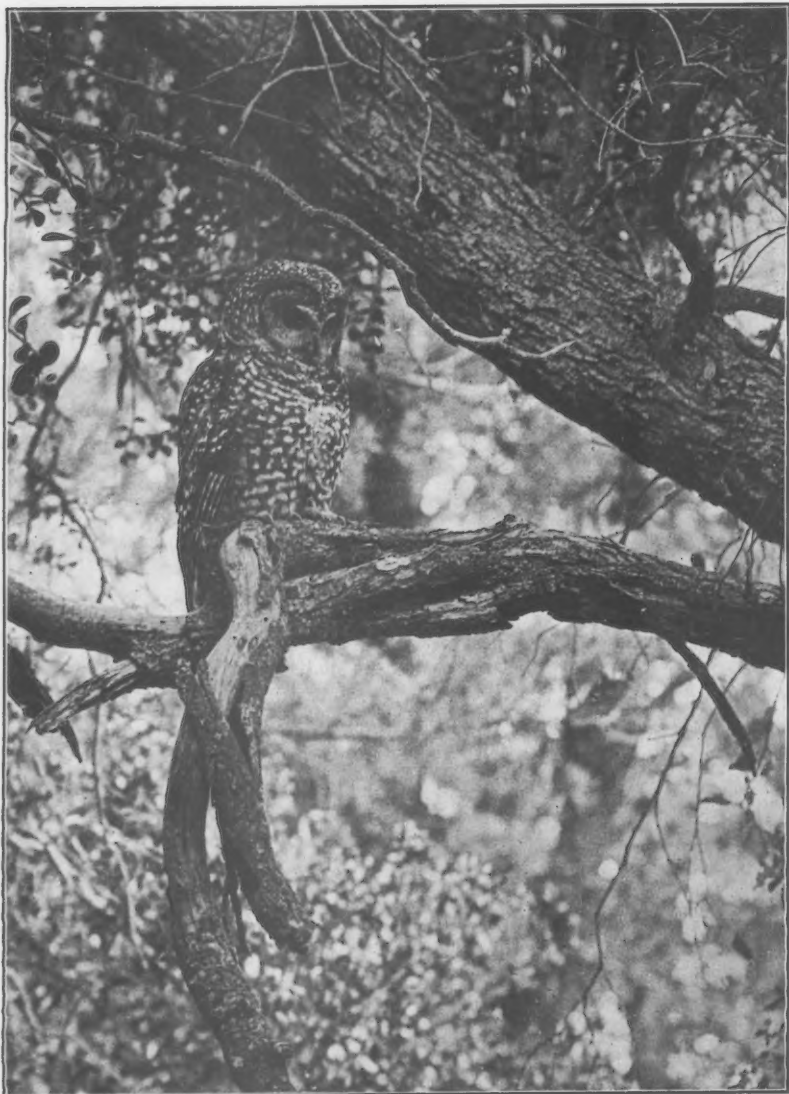


FIG. 55. AN ADULT SPOTTED OWL, *Strix occidentalis*, PEERED AT US FROM A CLOSE PERCH IN AN OAK.

hole, however, was sixty-five feet from the ground, nothing more was to be seen of the bird, and obviously nothing more was to be done without plenty of rope. So with many a backward glance we set out for the long ride back to civilization. To cap the climax of the day, we had hardly gone half a mile before we spied a condor circling low with evident interest in a white-marked ledge. Surely this was a day of days!

But the condors were destined to disappoint our photographic hopes. When we reached the spot again, after a slow-passing two weeks' delay, we found the birds still circling about the cliff, but a stiff climb showed the nesting ledge to be untenanted that year. For some reason they had not gone to



Fig. 56. SWINGING FROM THE FIR FIFTY FEET ABOVE THE GROUND.

housekeeping, although clinging tenaciously to the vicinity of their former nesting site. It was obviously their home even in the legal phrase, for it was "the place to which they returned for rest and recreation." But in the absence of egg or young they were rather shy for camera stalking. Nor could they be lured within range of a blind, even by the sacrifice of an antiquated equine offering. Poor "Ted",—a failure even in death!

The owls, however, behaved better. For, as Mr. Adriaan van Rossem, Mr. Philip Pierpont and the writer rode up to their home on May 31st, the old bird was sitting in plain sight on the edge of the nest hole with two well-grown

youngsters beside her. The round head and boldly spotted markings of the adult were plainly visible: we were looking on Spotted Owls at home! Small wonder that Van and I did something of a dance of triumph. To our astonishment the old bird did not seem to be disturbed in the least by our performance although we were directly below her. She merely peered down upon us, giving us splendid views of her plumage. Finally we left her to herself while we went on to pitch camp and look up the small birds a bit. The forms were characteristic of the altitude. The full, descending call of the olive-sided flycatcher set the key note, reminding us that the lowlands were left behind. California purple finches were singing in considerable numbers from the taller trees, western tanagers made flashes of color, and in the open places calliope hummers darted about. A courting male was taken by Mr. van Rossem. Every thick-foliaged oak had its black-throated gray warblers and, in an inaccessible crevice of the cliff itself, hundreds of white-throated swifts were apparently nesting. Twice a golden eagle sailed over us high in the air.

Next morning we reached the owl's nest early. To the best of my knowledge there had been but three previous authentic nesting records and astonishingly few records even of the birds themselves since the type was taken near old Fort Tejon in the early days of western ornithology. Bear with me, therefore, if I set down their actions and calls in perhaps too great detail.

A tall fir tree grew close in front of the cliff opposite the nest, and over a limb of this, as a preliminary to camera work, we tried to toss a weighted line. To our astonishment the weight almost struck the old owl. She had been perching in the tree and so perfect was her blending that we had not noticed her at all. She merely flew to a nearby tree. Her tameness was becoming more and more apparent. About nine o'clock, in spite of the noise of arranging rope and tackle in the fir, she (I use the feminine by assumption) flew directly to the nest. Judging from her movements, and from the low, excited squeaking of the young, she fed them—apparently something carried to them in her throat. If this was the case, the young were soon satisfied, for they retired to the inner sanctum of the pot-hole until afternoon.

The adult also slept the day away, but remained outside and in plain sight from where we swung from a limb of the fir fifty feet or so above the ground. We made what negatives we wanted, and then waited until four o'clock when all the owls had a period of sudden activity. The young came to the edge and tried their wings, hopping and flapping to and fro in the exposed part of the nest hole. The old bird, which had remained oblivious to the bang of our Graflex shutter, finally aroused herself and crawled parrot-wise along a narrow ledge of the wall face. She soon settled herself again, however, and slept so soundly that only by frantically flapping a focusing cloth could I even get her to open her eyes for a portrait. As the light grew too weak for photographs we left her still asleep with her back to the setting sun, the easiest sort of a target for even a stone.

Next morning the old bird sat dozing in a small oak near the nest, and only twenty feet from the ground. Her protective coloration, noticeable at all times, was particularly so this morning as she sat in the oak. But whether she clung to the cliff, or sat close against the mottled fir trunk, or in the spotted light and shade of the oak foliage, her harmonization was startlingly complete. This morning she seemed so oblivious to my approach that I was encouraged to climb the oak where a limb gave standing room on a level with her. An insane idea it seemed, and yet she was so absolutely devoid of common sense



Fig. 57. SPOTTED OWL: AS SHE SAT IN THE SPOTTED LIGHT AND SHADE OF THE OAK FOLIAGE HER HARMONIZATION WAS STARTLINGLY COMPLETE.

and fear that I was able to strap on my climbers and thud up the straight trunk below her till my hand was actually within five feet of her. All she did was to peer at me wide-eyed and bob slowly from side to side. But this was too close even for her, and she sailed across to an adjoining tree. She certainly was the incarnation of trusting tameness or stupidity,—call it what you will.

The new perch made photography impossible, but as we sat watching her we were treated to a glimpse of her morning toilet. Contorting herself into



Fig. 58. SPOTTED OWL: THE NEST WAS A POT-HOLE SIXTY-FIVE FEET ABOVE THE GROUND.

every conceivable position she shook her feathers into perfect place and carefully preened away every frayed feather tip. There was something ludicrous in her every action. Even in the midst of her toilet there were sudden periods when Morpheus seemed to overpower her and she would doze off, only to awake with a start a few moments later and continue the performance. Her movements were much more gentle than those of the horned owls. The lack of their ear tufts and yellow irides also gave her a far more agreeable expression, although I must confess that certain startled expressions,—when one did succeed in startling her,—seemed unpleasantly lynx-like. When she moved along a limb her every movement suggested a parrot, really a striking resemblance.

The next thing was to reach the nest in order to photograph the young, and here our troubles began. It was a good example of the difficulties of judg-

ing distances in a big country. We guessed the cliff as one hundred and fifty feet high and a block of stone on its brim as perhaps twenty feet square. The latter turned out to be as big as a two-story house, while the end of our two hundred foot rope writhed sickeningly seventy feet above the ground when we lowered it from the brim. It did not even reach the nest. A tree that we dropped against the base of the cliff, after much perspiring axe work, also fell short. A ledge just below the nest proved unnegotiable even for the goat of the party,—who shall be nameless. All this meant one thing: more rope and another long round trip.

Along toward four o'clock the young again grew active according to their daily custom, and as they appeared the adult flew to the nest from the perch where she had slept all day. As she alit she noticed the tackle dangling just above the nest and immediately circled back to the fir, and began uttering repeatedly a low, indrawn whistle, "Whee e e?" with a sharp rising inflection. If this was intended as an alarm note it had no effect on the young. They remained on the edge of the nest and only increased the bobbing interest they took in the rope above their heads. Soon came the deep, "Whoo, whoo, who, who" of the other parent from far up the mountain. He was answered by the supposed female and a moment later he, too, flew down into a tree near the nest. As we rode away they sat in nearby trees, outlined against the piled-up cloud masses of a storm back in the range.

On the sixth of June we rode till midafternoon back up the zig-zags of the steep canyon trail among the yellow bells of the mariposa lily and the cream clusters of flowering yuccas. At last we reached the owl cliff and a ludicrous anti climax. Picture the three grim cliff scalers with their five hundred feet of rope riding up and finding the owls not on the ledge at all, but come to meet them! It was nearly as bad as that, for there, in an insignificant oak across the ravine, sat the two youngsters with their parent. All three were well within the reach of any six-year-old boy. They were distant a hundred yards or so from the nest and the hillside rose so steeply on that side that they were almost level with the nest although not over fifteen feet from



Fig. 59. YOUNG SPOTTED OWL STILL IN THE DOWN.

the ground. That the young could have reached the spot unaided seems incredible, for although the primaries were well grown out, they were, with that exception, in the complete down, and were still weak. The alternative is that the old birds, continuing their distrust of the dangling rope, had deliberately moved them. Certain it is that they would not normally have left the nest perhaps for weeks.

As we climbed to the young in the oak the old bird displayed her first sign of vital interest, flying within touch of the intruding heads and peering at us from close perches among the branches. But her passes at us were not fearsome things. She never even snapped her bill. Silently she swooped near,

rather in an effort to see plainly, or decoy, than to harm or frighten us. And now continually came the low, musical, indrawn, whistled "Whee e e ?". The call would have come more suitably from the bill of some wee plaintive fly-catcher than from this great bird of prey. She also gave vent at this time to an utterly indescribable, turkey-like chuckle. Finally she hooted, but so low that it sounded like a dove, "Coo', coo', coo, coo." But the mate heard and his booming answer sounded from one hundred yards up the canyon. I was listening particularly for the canine quality in the tone and it undoubtedly has much of the full-throated explosive effect of a baying hound. It probably will not hold as an invariable rule, but it is at least interesting that every time either adult hooted, they used the indicated arrangement of two long and two short notes, "Whoo, whoo, who, who." We looked up this last deep-voiced bird where he sat close against the trunk of a pine and he proved to be as foolish as the supposed female. He did not even move when a pebble struck his foot.



Fig. 60. SPOTTED OWL: SHE GAVE A LOW IN-DRAWN WHISTLE WITH A RISING INFLECTION.

The young were docile, downy little things of a soft grayish and buffy white. They used neither bill nor claw, and the direst threat of the larger bird was a slight parting of the bill as it shrank back from the touch of our hands. This larger bird we took to camp for the night as mascot of a happy party and as hostage from the parent owl. The other young was left in a tree.

We arrived next morning to find the old bird busily tearing at a fresh-killed brush rat. Under the tree were the plucked tail feathers and primaries of two jays, probably the work of the owls. Only one regurgitated pellet was found. That one contained the partial skull and leg bones of a mouse. By this time the light had grown stronger, and the

old bird had ceased to show any interest whatever in the young which we were busily photographing. Instead she went calmly off to sleep.

We had decided to examine the nest in spite of its desertion, so in the cool of the afternoon we fastened a block to the end of our dangling rope, rove the new rope through it and went up from the bottom with the greatest ease. The nest cave was quite good-sized when examined closely, extending up and back for three or four feet. The nest itself, placed near the entrance, was two and a half feet across, and in situation and construction might well have been a raven's nest. Possibly it was so originally. In any event it had evidently been used for years. The comparatively large sticks of its foundation had rotted down and the interstices gradually filled with bones and hair until

it had become the mere matted platform of today. Behind it was the space into which the young retired during the brightest hours.

In the nest were the remains of another freshly-killed *Neotoma*, the dried



Fig. 61. A WILDERNESS OF PINES AND CLOUDS.

skull of some *Peromyscus*, and one dried pellet containing mouse bones. Oddly enough, no fresh pellets were found either in or below the nest, so I was unable to gather enough pellets for a comprehensive diet analysis. Such

positive evidence as we have, points solely to the smaller rodents as their source of food supply. Unquestionably, they are an exceedingly beneficial raptor, though their rarity would, of course, impair their collective usefulness.

As I hung there, studying at first hand the nest of a Spotted Owl, there came a last evidence of the bird's mild stupidity. Suddenly the shadow of her broad, silent wings fell across me, and I instinctively cringed. While I still clung to the nesting ledge with one hand, and to her protesting young with the other, she swept in and alit within eighteen inches of my fingers. And yet, so little of menace was in her eye and pose, that I calmly left my bare hand within striking distance until we were ready to lower away. Surely the veriest dicky-bird of them all,—so despised of Mr. Dawson in a certain raptor eulogy,—would do more to avenge the supposed rape of her offspring than did this taloned bird of prey, sitting idly by without apparently the courage to protect its young by fight, or the common sense to protect herself by flight.

One of the young was left in the nest in the confident hope that it would be safely reared there as soon as our tackle should be removed. The other and larger bird was taken, and is now in my collection. It proved to be a male, and furnishes a good example of the bird in the juvenal down.

On our way out the next day, we were delighted to see the adult bird and her young sitting complacently side by side in the nest as we passed, the old bird content in the quiet possession of her home, the youngster still abob with undiminished curiosity. And thus we left them—to the undying disgust of the dyed-in-the-wool collector of the party—left them to their wilderness of pines and clouds, and wrinkled, fog-filled valleys, thousands of feet below.

York Harbor, Maine, July 25, 1914.

HENRY W. MARSDEN

By LOUIS B. BISHOP

ON FEBRUARY 26, 1914, at Pacific Grove, California, after a short illness with pneumonia, there rested from his labors Henry Warden Marsden. Known personally to but comparatively few ornithologists and even by name to not very many men out of California, the last fifteen years of his life were devoted almost exclusively to collecting birds; and those of us who possess the results of his work have not only beautiful bird skins but a living memory of an earnest, loyal helper, who spared neither time nor effort that our collections might be enriched with what we needed for scientific study, and no more. For, like all truly interested in birds, he hated to take life needlessly. Writing me from Arizona some years ago he said of the Pyrrhuloxia: "They are too beautiful to kill"; and in his last letter from Pacific Grove, written only a few days before his death, I read: "I have skinned forty Cassin Auklets which I found dead along the shore. I don't know what I shall do with them, but I hated to let them spoil." And this conscientiousness followed him through all his work. His chief fear, frequently expressed to me in letters, was that he would send us more than we needed of any species.

Things of beauty, as I have said, his bird-skins were, and probably, all things considered, the finest ever made; they could only have been the product of one with both rare talent and love for his work. And both of these he had, as well as interest in other branches of ornithology, though he wrote but little.

His letters to me breathed always the same spirit,—hope that he would get us what we wanted, sorrow that he had not been more successful, or extreme pleasure that what he had sent had proved interesting. He was our personal friend, to whom collecting was a pleasure, and who rejoiced in adding to our collection what it was impossible for him to keep himself.

Born in Boston in 1856, of English parentage, his paternal grandfather a clergyman of the Church of England, he worked for many years as a skilled accountant in the firm of C. D. Hovey & Company. Having lost both wife and child while still a young man, he lived for ten years in the family of Mr. A. G. Olney, of Woolaston, Massachusetts, his most intimate friend. Already much interested in birds he became a member of the Bristol Branting Club, founded by John C. Cahoon, whose clubhouse is at Monomoy on Cape Cod, and, after the sad death of the latter while collecting birds in Newfoundland, was elected his successor as Secretary and Treasurer. This post he held until sickness compelled him to seek a more genial climate than that of New England. At Monomoy he and the writer became acquainted in September, 1890. There, as we tramped the mud-flats and sand-hills together and fought mosquitoes, our mutual interest in birds from a different standpoint than that of sport drew us into a friendship that lasted till his death. Eskimo Curlew, which we obtained at that time, proved to be among the last taken in Massachusetts.

At Monomoy we met again for a few days in the summers of 1892, 1894 and 1897, but by the last year Mr. Marsden's health had begun to fail. That fall tuberculosis of the lungs manifested itself, and he spent the winter in Florida in search of health. Some improvement followed, and again we spent two weeks together at Monomoy the following August. But it was all too evident that the disease was not cured, and he returned to Florida for the winter, writing me from there in February, 1899, that he had decided to spend the summer and following winter there, and then go to Colorado.

"I hate awfully to give up my old associates, but I must submit to the inevitable", in this letter, was the nearest to a complaint I ever knew him to utter. So in broken health and well on toward middle age he turned his face to the West to spend the rest of his life among strangers, his home and friends left behind, and what seemed his life-work broken. But out of this apparent failure he made success, and found his true vocation. For, that collecting birds was his real calling, the excellence of his work attests. No one can do beautiful work unless his heart is in it. To some his work may not seem the highest in ornithology, but it was the direction in which his opportunity and duty lay, and perhaps some day we shall all realize better than now that there is indeed "no great and no small to the Soul that maketh all".

In the fall of 1899 he went to Colorado, spent the winter of 1900-01 in New Mexico, and on his return to Colorado the following spring began collecting birds for some of us in the East, which work he continued until his death. This gave him a new interest in life, and made him feel he was still of use in the world, even though he was incapacitated for a more confining employment. But, after temporary improvement, his health again failed, and in the fall of 1902 he moved to California, spending the winter in Redlands. Here he felt he had found the climate for which he sought, his health improved, and, after spending the summer of 1903 again in Colorado, he went to Witch Creek, San Diego County, California, which was henceforth his home. Most of the next year he spent at Witch Creek, his health and spirits steadily improving in the dry, warm air which he found there.

In January, 1905, he went to Arizona, spending February and October near Tucson and the months between in the Huachuca Mountains. There he added the Salvin Hummingbird to the avifauna of the United States. The winter saw him again at Witch Creek, and the following spring he joined a party under Mr. W. W. Brown, Jr., on a collecting trip to Guadalupe Island and other islands off Lower California. The hardships of this trip were too great for his enfeebled constitution; but he felt so much better after another summer and fall at Witch Creek that February, 1907, saw him again at Tucson. This time he visited the Santa Rita and Chiricahua Mountains; but the altitude, climbing, and lack of comforts told rapidly on his strength, so that by September he was obliged to return to Witch Creek.

This was the last time he left California. During the following year he made trips to various parts of this State, collecting more or less extensively in Humboldt, Mendocino, Yolo, Siskiyou, Tehama, Colusa, Solano, Merced, Kern, San Mateo and Monterey counties. At Sherwood, in Mendocino County, in 1908, he added the Chestnut-sided Warbler to the birds known to occur in California, and at Eureka the following year, the Alaska Longspur. Soon after he decided to make California his home, he joined the American Ornithologists' Union and the Cooper Ornithological Club, and enjoyed the friendship of those members of the latter that his travels allowed him to meet, and I think he left friends wherever he went. He was a delightful companion. No one could meet him without appreciating his absolute sincerity, or become acquainted with him without liking him. His letters showed he had much interest in the Cooper Club, but diffidence prevented his contributing frequently to the pages of *THE CONDOR*. He felt his true vocation lay in collecting and preparing beautiful specimens, not in writing about them. Occasionally notes by him may be found in *THE CONDOR*, as enumerated at the end of this article, but that is all.

Thus the years passed in an almost constant struggle against ill-health, and in loneliness tempered by his interest in his work. Early in November, 1913, he left Witch Creek on what proved to be his last trip, and, after a couple of months at Colusa, reached Pacific Grove in January. There, on the 17th of February, 1914, he added the Horned Puffin (*Fratercula corniculata*) to the list of California birds, and only nine days later, his long contest with sickness and loneliness ended, passed into a "sleep that knows not breaking, morn of toil, nor night of waking."

The following articles appeared from the pen of Henry W. Marsden:

Aerial Battle of Red-tailed Hawks, *Buteo borealis calurus*. *CONDOR*, VII, 1905, p. 53.

Feeding Habits of the Lewis Woodpecker. *CONDOR*, IX, 1907, p. 27.

Chestnut-sided Warbler at Sherwood, Mendocino County, California. *CONDOR*, XI, 1909, p. 64.

Alaska Longspur at Gunther's Island, Eureka, California. *CONDOR*, XII, 1910, p. 110.

New Haven, Connecticut, June 23, 1914.

NOTES ON A COLONY OF TRI-COLORED REDWINGS

By JOSEPH MAILLIARD

ALTHOUGH some years ago I described a breeding colony of Tri-colored Redwings (*Agelaius tricolor*) located near an artesian well in Madera County, California, I have been so much interested in another colony

this year, with better opportunities for observation, that it seems pardonable to touch upon the subject once more.

The nesting ground before described (CONDOR II, November, 1900, page 122) was a remarkably crowded one. In a patch of tules of very limited extent beside a flowing well, the birds had built their nests in such numbers that many were abandoned when other nests were built above them, and the tules grew so high and thick as to make the lower tiers dark, dirty and inaccessible.

The colony breeding this year on the Rancho Dos Rios, Stanislaus County, California, was a much larger one than the above, but the breeding ground was acres instead of yards in extent. While there must have been several thousand birds in it there was plenty of room and no great crowding together of nests, though even with so much space there were many nests only a few feet, and in some instances only a few inches, apart. None, however, were built *over* others, notwithstanding the different heights above the water, varying from six inches to about three feet, the water itself being about knee deep.

While the writer first noticed signs of building on April 14, 1914, it probably commenced shortly before that date, as the spot had not been visited for several days previously. On that day birds were noticed carrying building material, and upon further investigation a few beginnings of nests were found. As only a comparatively small portion of the tule patch was explored it is very possible that there were some nests not seen on that day that were farther advanced in construction.

The colony was visited next on April 23 on which date some nests were found to contain their full complement of four eggs, some two or three, and others still empty but apparently ready for occupancy, the majority being those with two or three eggs. A few sets were selected from the vast number on this day and the next, and the eggs were found to be from fresh to slightly incubated, with one or two sets about one-third along.

Another visit was made on April 29, when most of the nests seen on the 23rd and 24th, along the paths made by forcing my way through the tules on that occasion, contained four eggs, although a few held only two or three, and some were still empty. A small number had hatched out within the last few hours, but nests containing young were scarce. There appeared to be birds yet building and a few sets seemed to be fresh. Among those nests in which incubation was completed the greater number contained from two to four young, yet a few held only one. Many nests were very poorly constructed, and were falling down on one side; so much so, in fact, that the eggs had evidently rolled out. In one such case a poor youngster, just hatched out, was the only occupant, and he was hanging on for dear life with tooth and toe-nail at the very lowest edge. Rapid growth of the tules may have had something to do with the condition of some of these nests, but there evidently was a great difference either in architectural ability or constructive energy among the members of the colony.

In the description of the Madera County breeding ground stress was laid on the fact of so many nests having been abandoned, while in this colony but few were deserted, and those possibly by the accidental death of the builders, and but few were robbed by hawks. It seemed, however, as if the birds must have stolen nests from each other; as, for instance, in the case of one set that was blown and found to be composed of three very fresh eggs and one extremely rotten one! And in another where one holding the full complement of four was found to be built over a nest already containing four eggs, rotten,

dirty and stained by the damp stuff which had been used to form the bottom of the second nest. Our collection (that of J. & J. W. Mailliard) contained a set of five eggs of *A. tricolor*, taken by Walter E. Bryant years ago, and the writer's ambition was fired to find one himself, never having been so fortunate in several previous experiences with breeding colonies of this species. On this occasion success crowned his efforts, and when just about to give up the search, wet and tired after the examination of hundreds of nests, a five set was discovered. Fortunately it was in such state of incubation as to allow of its being saved, and as to leave no room for doubt about its being actually one set instead of a combination like the two just mentioned above. By the time incubation was completed in the majority of nests and vast numbers of young beaks were opening wide for needed nourishment the barley in the neighborhood was just reaching the pulpy stage, being "in the milk", as it is called, when the kernels of grain are much relished by the redwings on their own account and much prized as a food for the young. Hence a large amount of damage is done by these birds when the grain is in this state, and this keeps up even when the grain becomes quite hard. But, while thousands of the redwings were visiting the barley fields, as many more were bringing in grasshoppers, cutworms, caterpillars and various sorts of insects in various stages of growth, and probably the harm done to the grain is more than offset by the good work of destroying injurious pests of the insect world.

A few adults were shot in the first week in May, at a time when some of the barley was in the most appreciated stage of development, to ascertain the contents of the stomachs. It happened that those particular individuals, at that time of day at least, had been more diligent in the matter of hunting insects than in robbing the barley fields, for only two or three grains of barley were found in each stomach the contents of which consisted mostly of insects of several sorts (not determined), grasshoppers being largely in evidence. That, however, a great deal of barley was consumed was shown by the stripped heads found on the stalks, to say nothing of the visual evidence of the flights of birds to and from the grainfields.

As the youngsters grew larger, leaving their nests and perching in the tules, the parents became busier and busier supplying food for the rapidly developing appetites, evidently deeming it necessary to maintain a large proportion of insect life in the bill of fare, judging by the direction from which food was brought and by the action of the parents when collecting the food supplies. When some nearby alfalfa fields happened to be irrigated great numbers of the adult birds arrived on the scene and gathered in quantities of fat grubs that were brought to light by the water, most certainly doing a beneficial act to the owners of the fields.

After hunger fear seemed to be one of the first sensations developed in the young nestlings. So much was this the case that the youngsters, say a week old, would flop out of the nests on the approach of a human being and fall into the water. It was impossible to force one's way through the tules without making more or less noise, and the number of suicides would have been so great if an extended visit had been made to the nesting ground that the writer contented himself with investigation of the outer edges, only, during the nestling period, not wishing to be responsible for a large and useless loss of life among the juvenile population. As the young left the nests and took to the tules their feeling of fear did not diminish, and they would flutter or scramble away so

fast in the thick high tules that it was a difficult matter to procure a few for specimens to show growth and development.

By June 15 the colony was greatly scattered, many of the young accompanying their parents abroad in search of food. Yet there were still some on the original ground which were too young to fly, as shown by the number of old birds carrying food to that particular spot. Those old enough for flight seemed to return to the tules every night, and often for the purpose of finding rest and shade in the daytime as well. By July 1 the colony was beginning to disintegrate, and even before that date small flocks of old and young together could be seen working toward the north, while but few were noticed returning from that direction.

San Francisco, California, July 2, 1914.

BIRD NOTES FROM THE SIERRA MADRE MOUNTAINS, SOUTHERN CALIFORNIA

By H. ARDEN EDWARDS

DURING a recent trip, in June, 1914, to Barley Flats, a section of the Big Tujunga Range, of the Angeles Forest Reserve, I had the pleasure of observing an instance where the communal spirit was highly exemplified; and although the conditions bringing about a cohesion of interests that were perfectly harmonious so far as I could see, were to a certain extent arbitrary, yet it is interesting to note that five out of the six species involved were constantly brought, in more or less degree, into active competition with one another; and that in a locality where timber conditions forced them into an area of restricted activities.

The scene of this interesting bit of bird life was the bare stub of an immense fir tree, about eighty feet high, and probably six feet through at the base. The sole means of ascending it was afforded by several jagged cracks in the body wood (the bark being entirely gone) and an occasional slippery knot or stub, that indicated where long ago some mighty branch had swept outward and downward, bearing rich masses of dark green foliage. The members of this community which were of greatest interest to me were a pair of White-throated Swifts (*Aeronautes melanoleucus*) that had, or seemed to have, a nest in a large crack about thirty feet up. As I had never before found these birds nesting in trees, and all the data I have seen refers their nesting sites to inaccessible cliffs, etc., I was very properly "fussed up" about it.

Climbing up to the fissure where the female had flown in and out several times, I tried to use my flashlight and mirror attachment, but found that the crack extended side-ways for several inches, and then ran at right angles again; so there was nothing left to do but to take my pocket axe and pry off a section of the wood. To those who have had similar experiences, I need not describe my disappointment when nothing met my eager eyes, save the nest itself, which appeared to be completely finished. Now if I had not seen any birds around here and had opened this cavity, I should have said "a swallow's nest" and gone my way with peace of mind; but that the swifts were interested in it, and that very closely, was made manifest, when they darted at me and

swung about my head in ceaseless flight, and with frightened twitterings. The nest was composed of dried grasses, several needles from the big-cone spruce, some dried leaves, and a few feathers of a dusky white, that were evidently from the birds themselves. The dry grass was the dominating material and was woven, or rather laid, the long way of the crack. The inside of the nest was about two and a half inches in diameter, not over one and a half in depth, and was a little longer one way than the other. The whole affair was rather loosely built and there was no finish at the upper edge of the nest proper except a few coiled grasses.

After I had replaced the slab of wood as carefully as possible I continued up the snag to the next crack, which was some five feet higher, and showed on inspection seven full-fledged young of the Western House Wren (*Troglodytes aedon parkmani*). The little mother of this brood continued to fly back and forth to the nest with food all of the time I was on the snag, usually with some small moth or butterfly in her bill, sometimes several. The next thing to engage my attention was a small hole just around the tree from the wren's nest. After several ineffectual attempts to reach it, I was about to give it up in spite of the fact that the surface below the entrance was polished clean from recent use, when my ear caught a subdued hissing. At first I thought it was the young wrens, but on placing my ear against the stub and tapping lightly I found it to proceed from the hole in front of me; now, my bump of curiosity bulging, I was determined to see what was inside that hole, risk neck or not. So off comes my belt, and looping it over a branch a few inches long just above me, I placed my arm through it, and using my stockinged feet as levers, slowly swung myself out, till by extreme rubber-necking and the use of my one free arm, my mirror disclosed a tangle of what looked at first sight like a lot of animated mushrooms. Later observations disclosed their identity when a female Cabanis Woodpecker (*Dryobates villosus hyloscopus*) flew to the nest cavity with food for her young.

The next hole to stand inspection after I had taken a much needed rest, was on the south side of snag, eight or nine feet higher up, and contained one egg of the Mountain Chickadee (*Penthestes gambeli baileyae*). Just around the tree again and about four feet higher up, a pair of Western Bluebirds (*Sialia mexicana occidentalis*) had a cozy nest in a large cavity which sheltered two handsome blue eggs, looking as if two stray bits of the summer sky had become entangled in the grasses of the nest. Continuing up the snag I examined a number of holes and cracks, some containing old nests, others empty, until, within three feet of the jagged top, a female Western Martin (*Progne subis hesperia*) flew out of a hole on the north side. She scolded me to such purpose, that, instead of using my axe to pry into her house-keeping secrets, I threw it to the ground below, and followed after it, as best I might, finding, by the way, that it is far easier to ascend a snag than it is to descend it.

This completed my tally for this apartment house, and showed six pairs of insect-eating birds. Only one of these made extended trips beyond the circle of investing trees. These formed an open wall about a little mountain meadow or park-like space, covered with flowers, and therefore forming a pre-eminently suitable place for the capture of winged insects. The Cabanis Woodpeckers invariably flew towards the deep canyons on the north slopes of the flats, where no doubt they found pickings more to their liking in the shape of fat grubs among the fallen logs and stumps. As near as I could judge without a watch they made trips at intervals of about four minutes, the male carrying

food as well as the female. The wrens were the only other members that left the open spaces around the tree, and usually it was only the female, who seemed to do all the feeding. The male spent most of his time on a stub above the nest singing, occasionally making short excursions after food. The other four species spent most of their time around the tree itself; the Chickadees in an untiring search for insects upon the trunk and on the fallen limbs and bark around the base; the Bluebirds and Martins using the higher limbs as stations from which to pursue butterflies, etc.; and the two Swifts taking the stump as a point to circle and dodge around in graceful flight.

I noticed that the Swifts had a habit of suddenly darting straight down, as on the angle of a long V, and, making a half turn at the lowest point, shooting up again, in an ascent of inconceivable rapidity. As this brings me back again to this interesting bird, I will confess that I am all at sea, as regards this particular instance of unusual nesting. To all appearances the nest which I examined, and which I had seen the Swifts enter a number of times (nine in all, to be exact), was typical of the Tree Swallow (*Iridoprocne bicolor*) of which I had previously noted several pairs upon the flats, but none around this particular stub. All of the time I was on the snag the Swifts would fly at me, keeping up an angry and protesting twittering; and after I had come down, first one and then the other would alight at the hole and either go inside, or would hang on the edge for awhile and then fly off again with more excited twitterings. When at rest the white wing patches were very noticeable and also the extra long narrow wings that were crossed scissor-fashion below the tail. As there was absolutely no question of identification in this case, the query presents itself, first, what causes had operated to force these birds to choose this unusual nesting site? And secondly, was this nest entirely of their own making? I say entirely, because I saw one of the birds carry a piece of grass into the hole after I had left the tree. Or had they pre-empted a swallow's nest, remodeling it to suit their own taste? Of one thing I am positive, there was no soft vegetable or gummy matter of any kind in the nest composition (I lifted the nest up expressly to see), such as I have seen mentioned by all writers on the subject before.

In answer to the first question, I can only note a few facts that may bear upon the subject. In an area of eight or ten miles around the flats, there are very few cliffs that would fill the needs of these birds, those which are of any extent presenting few cracks or fissures that would serve as nesting sites. One exception of which I have knowledge is, or rather was, until the winter just passed (when a rock slide shaved it absolutely bare), a large broken mass of granite, high up on the slopes of Strawberry Peak (in the Big Tujunga Range) situated a short mile or so to the northwest of the extreme western edge of Barley Flats. Here in previous years I have observed numbers of the Swifts during the breeding season, but the nature of the intervening country has prevented a closer investigation.

One other place where I have noted them in the breeding season is on the back slopes of San Gabriel Peak near the headwaters of the West Fork of the San Gabriel River. In preceding years the species has been fairly abundant along the rocky walls of the canyons here, but this year they have evidently been driven from their usual haunts by the heavy blasting which has been done, incidental to driving a new trail through the canyon. If our birds were some that were accustomed to nest in either of the places mentioned, or if an earlier nest in some more legitimate site had been by some cause destroyed, it might

easily be imagined that a dislike to leave this section would drive them to make their home upon the flats where, omitting the rocks and cliffs, other conditions would appear most favorable. Be that as it may, my untimely disturbance of the nest, must have destroyed all faith in its suitability, for after the first day they were never seen to enter it again, and in a couple of days left entirely.

I append a list of the birds observed upon the Flats.

- Band-tailed Pigeon. *Columba fasciata*. Several seen.
 Sharp-shinned Hawk. *Accipiter velox*. One pair.
 Cooper Hawk. *Accipiter cooperi*.
 Western Red-tailed Hawk. *Buteo borealis calurus*. One seen.
 Golden Eagle. *Aquila chrysaetos*. Examined a this-year's nest.
 Long-eared Owl. *Asio wilsonianus*. Two young shot before our arrival.
 Pacific Horned Owl. *Bubo virginianus pacificus*. Seen in the evening.
 Cabanis Woodpecker. *Dryobates villosus hyloscopus*. Nest with young.
 Red-breasted Sapsucker. *Sphyrapicus ruber*. One seen.
 California Woodpecker. *Melanerpes formicivorus bairdi*. Breeding.
 Red-shafted Flicker. *Colaptes cafer collaris*. Breeding.
 Dusky Poor-will. *Phalaenoptilus nuttalli californicus*.
 Texas Nighthawk. *Chordeiles acutipennis texensis*. Several seen.
 White-throated Swift. *Aeronautes melanoleucus*. One pair, breeding?
 Black-chinned Hummingbird. *Archilochus alexandri*. Young in nest.
 Anna Hummingbird. *Calypte anna*. Breeding.
 Rufous Hummingbird. *Selasphorus rufus*. One male.
 Arkansas Kingbird. *Tyrannus verticalis*.
 Ash-throated Flycatcher. *Myiarchus cinerascens*. Breeding.
 Black Phoebe. *Sayornis nigricans*.
 Olive-sided Flycatcher. *Nuttallornis borealis*. In wooded canyons, among the pines.
 Western Wood Pewee. *Myiochanes richardsoni*. Full grown young in nest.
 Western Flycatcher. *Empidonax difficilis*. Breeding.
 Wright Flycatcher. *Empidonax wrighti*. A pair seen carrying nesting material to outer limb, high in a pine tree.
 Blue-fronted Jay. *Cyanocitta stelleri frontalis*. Nests found containing young and eggs.
 California Purple Finch. *Carpodacus purpureus californicus*. Quite tame about the camp.
 Lawrence Goldfinch. *Astragalinus lawrencei*. Breeding.
 Sierra Junco. *Junco oreganus thurberi*. Breeding.
 San Diego Song Sparrow. *Melospiza melodia cooperi*.
 Spurred Towhee. *Pipilo maculatus megalonyx*. Breeding.
 Green-tailed Towhee. *Oreospiza chlorura*. Breeding.
 Western Tanager. *Piranga ludoviciana*. Nests found with eggs and with young.
 Western Martin. *Progne subis hesperia*. Breeding.
 Tree Swallow. *Iridoprocne bicolor*. Several pairs seen.
 Northern Violet-green Swallow. *Tachycineta thalassina lepida*.
 Western Warbling Vireo. *Vireosylva gilva swainsoni*. Breeding.
 Hutton Vireo. *Vireo huttoni*. Breeding.
 Lutescent Warbler. *Vermivora celata lutescens*. One pair around camp.
 Black-throated Gray Warbler. *Dendroica nigrescens*. Three noted at camp.
 Golden Pileolated Warbler. *Wilsonia pusilla chryseola*. One pair at camp.
 Rock Wren. *Salpinctes obsoletus*.
 Dotted Canyon Wren. *Catherpes mexicanus punctulatus*. With full-fledged young.
 Western House Wren. *Troglodytes aedon parkmani*. Nests found with eggs and with young.
 Slender-billed Nuthatch. *Sitta carolinensis aculeata*. Several seen. Found breeding here in 1913.
 Bailey Mountain Chickadee. *Penthestes gambeli baileyae*. Breeding.
 Pallid Wren-tit. *Chamaea fasciata henshawi*. Breeding.
 Western Bluebird. *Sialia mexicana occidentalis*. Nests found with eggs and with young.

Los Angeles, California, July 4, 1914.

A STUDY OF THE STATUS OF CERTAIN ISLAND FORMS OF THE GENUS *SALPINCTES*

By H. S. SWARTH

(Contribution from the Museum of Vertebrate Zoology of the University of California)

OF SCARCELY less interest than those susceptible types of animals which, covering a vast expanse of territory, show wide variation in response to the difference in surroundings at different points, are the forms occasionally observed, just as wide ranging, and over a similarly varied region, but still remaining uniform in appearance over most or all of their habitat. Perhaps as striking an example of the latter class as exists in North America is the Rock Wren (*Salpinctes obsoletus*), the unyielding nature of whose characteristics is in strong contrast to the adaptability shown by other members of the same family of somewhat similar distribution, *Thyromanes* for instance.

The present study, begun by the writer partly at the instance of Mr. Grinnell, to ascertain, if possible, the true status of certain series from the Santa Barbara Islands, is based mainly upon the collection of *Salpinctes* contained in the Museum of Vertebrate Zoology of the University of California. In addition to these specimens there were available the series from the Grinnell, Morcom, and Swarth collections, on deposit in the same institution; and also the collections of F. S. Daggett, and of George Willett, in the Los Angeles Museum of History, Science, and Art. The Grinnell, Daggett, and Willett collections contain large suites of skins from the Santa Barbara Islands. Of exceptional value and interest is a series of twenty-five skins kindly loaned me by Mr. John E. Thayer, containing birds from certain of the islands, including topotypes of *S. obsoletus pulverius* in newly acquired autumnal plumage. Much of the other island material available consists of spring and summer specimens, more or less worn and faded, and these fresh fall specimens give opportunity for comparisons not possible before. I wish here to express my appreciation and gratitude to those persons concerned for the privilege of assembling and studying the material from the above mentioned collections.

Perhaps the one feature brought most strongly to the writer's attention is, as mentioned above, the indifference shown by the species *Salpinctes obsoletus* to conditions forming absolute barriers to many other animals. It is true that our knowledge of the genus *Salpinctes* is rather unevenly distributed. By the latest authority on the group (Ridgway, 1904, pp. 643-653) it is regarded as composed of four species, one of these being divided into six subspecies, three mainland and three island forms. Of all these divisions of the genus, one subspecies, *S. obsoletus obsoletus*, is fairly well known, while it is probably safe to say that none of the others is thoroughly understood. It is evident, however, that taking the distribution of the genus as a whole, extending from Central America over western North America to southern Canada, it is only at the southern limits of the range that there is any tendency toward a separation into well differentiated forms. Here, in a relatively restricted and unvaried portion of America, occur four recognizable forms, as contrasted with the one (*S. obsoletus obsoletus*) ranging over that part of the North American mainland which comprises about three-fourths of the habitat of the entire genus.

Study of the range of the North American Rock Wren (*S. o. obsoletus*)

reveals such an utter disregard of practically all of the various barriers serving as checks to most other animals, that one is rather at a loss to distinguish the factor or factors that finally limit its dispersal. Temperature and humidity, usually of prime importance, seem here, at first glance at least, to be without their customary potency. Rock Wrens are found from the floor of the hottest desert to the summit of the coldest mountain top; while as strong a contrast is afforded by the aridity of these same deserts compared with the various islands on which the wrens are also abundant. The infinite variety of environment which throughout western North America has produced such marked results upon many of the animals of the region, is without visible effect upon this unyielding organism, although over much of the country the birds are evidently non-migratory, a habit of life generally favorable to the production of variations. However, there is probable significance in the fact that the eastern limit of the Rock Wren in North America approximately corresponds with the eastern boundaries of the arid division of the Austral Zones, the main habitat of the species; so that it seems safe to say that it is the increasing humidity eastwards that finally acts as a check in this direction. The assumption is borne out by the fact that there is no marked change in the topography of the country at this point. The species covers a part of the Great Plains region but does not extend over the whole of it.

In local distribution, however, it seems apparent that features of environment other than the variations in temperature or humidity encountered determine the boundaries. The relatively great difference in humidity between the Colorado Desert and the Pacific slope of southern California, for example, obviously is of no effect. The feature essential to the presence of the Rock Wren is open, unforested country. Furthermore, open plains, uniformly grass-covered, will not answer. There must be areas of bare rock, the steep walls of gulches or creeks, precipitous cliffs, or other similar surroundings. These provided, and there evidently are not in the part of North America occupied by this bird, variations of temperature or humidity, from valley to mountain, or from desert to ocean, sufficient either to check its distribution or to obviously modify its appearance.

Though the species is found over so much of western North America, it is useless to look for it amid forested country, and it is not frequently found in even moderately dense chaparral. Its northward dispersal along the Pacific coast is evidently stopped by the forests of the region.

The islands off the coast of California and Lower California offer, in their barren and generally unforested condition, surroundings evidently highly favorable to the Rock Wren, and the species has found its way to every one. Here, if anywhere, it would seem that variations from the general type should appear, for the birds are isolated on each of the islands, while the species is flourishing on all of them. This isolation in most cases, however, has had so far hardly any perceptible effect, and while there is apparently a slight general tendency of island birds toward the development of at least one feature, there are specimens at hand from each of the California islands which are not to be distinguished with certainty from the mainland form.

Some years ago an insular form was described by Grinnell (1898, p. 238), *Salpinctes obsoletus pulverius*, from San Nicolas Island. Its habitat was regarded as confined to San Nicolas Island, but in a later publication the describer (Grinnell, 1902, p. 68) extended its range to San Clemente Island also. This race was founded upon characters of structure and coloration, and

though at least one writer (Willett, 1912, p. 101) has questioned its distinctness, it has received quite general recognition as a valid race. The subspecies was described from very worn adults, collected in May, no birds in fresh autumnal plumage being available. This want has now been filled by the loan of four September specimens from the Thayer collection, and I have consequently been able to make more satisfactory comparisons of island and mainland birds than has been done heretofore.

The characters of *S. o. pulverius* as given by Grinnell (l. c.), consist, as compared with *S. o. obsoletus*, of notably greater size of bill and feet, and peculiarly yellowish coloration; as given by Ridgway (1904, p. 649), of "larger and relatively stouter bill and much paler, more buffy coloration."

First, as regards the supposed color differences: Grinnell (l. c.) remarks that the "yellowish coloration may be due in part to the bleaching and abrasion of the plumage, but the character is, nevertheless, quite apparent when compared with mainland specimens in correspondingly worn plumage." The ochraceous suffusion remarked upon is truly a conspicuous feature of San Nicolas Island birds in abraded summer plumage, and it is not apparent in any similarly worn examples from the neighboring mainland, but nevertheless it is merely an adventitious acquisition, and one that can *not* be regarded as a specific character. This despite the fact that it could probably be safely used in distinguishing midsummer birds! In a similar manner four of the five adults of *guadeloupensis* at hand, collected in May, are more or less discolored with a reddish suffusion over the entire plumage. This also, it is safe to say, is the result of some peculiarity in surroundings acting directly upon the feathers, and not to be considered as an inherent character of the species.

Four September specimens and one January bird from San Nicolas Island have been carefully compared with corresponding mainland specimens, and I am unable to distinguish the slightest significant difference in color or pattern. Shade and markings of back, breast, flanks, under tail coverts, etc., have been considered separately, and while there is great variation in all these features among birds from any region, I can find no tendency among the San Nicolas Island specimens toward the development of any distinctive color character.

Second, as regards differences of size: As shown in the accompanying table of measurements, *S. o. pulverius* as compared with the mainland *S. o. obsoletus*, has a slightly greater average length of culmen. This difference in culmen length is, I believe, somewhat greater than appears in these tables, especially as regards the females, where, according to the figures, it is not very well marked. Of the six females used in the measurements, four were collected in September. They are in fresh winter plumage, but whether they are adults, a year or more old, or immatures of the previous spring, was not noted by the collector, and there is not now, of course, any way of telling. To ascertain something of the variation by age I measured a small series of mainland birds in first winter plumage, the age determined by condition of the skull, and found the length of culmen appreciably less than in others unquestionably adult. In September collecting many more immatures than adults are taken, and it may well be that most or all of the San Nicolas Island September birds at hand are immatures in first winter plumage. Thus, invaluable as they are for color comparisons, it is possible that these specimens are not to be relied upon to show the true character of the race as regards length of

MEASUREMENTS OF SERIES OF ROCK WRENS

	Wing	Tail	Culmen	Tarsus	Middle toe without claw
<i>Salpinctes o. obsoletus</i> :					
10 adult males, mainland of southern California.	71.8 (68-76.2)	53.4 (50-58)	17.9 (17-19)	21.2 (20-22)	13.9 (13-14.5)
3 adult males, Santa Cruz Island, California.....	72.3 (71.8-72.5)	51.6 (50.2-52.5)	17.2 (16.5-18)	20.7 (20.2-21.5)	13.8 (13-14.5)
2 adult males, San Clemente Island, California..	70.2 (69-71.5)	49.4 (49-49.8)	18 (17.5-18.5)	21.2 (21-21.5)	14.3 (14.2-14.5)
3 adult males, Santa Barbara Island, California..	69.2 (67-72.5)	52.3 (51-53)	17.5 (16.5-18)	20.5 (20-21)	14.1 (13.8-14.2)
1 adult male, Cerros Island, Lower California.....	68.5	50	19	20.5	14
3 adult males, Ildefonso Island, Lower California (68-73)	70 (68-73)	51.7 (50-53.2)	18.4 (17-19.8)	20.4 (19.5-21.5)	14
<i>Salpinctes o. pulverius</i> :					
6 adult males, San Nicolas Island, California.....	70.4 (67.5-74)	51.1 (49-52.5)	19.2 (18.2-20)	21.9 (21-22.5)	14.1 (14-14.5)
<i>Salpinctes g. guadeloupensis</i> :					
3 adult males, Guadalupe Island, Lower California	64.3 (64-65)	46.8 (46-48)	20.2 (20-20.5)	20.3 (20.2-20.5)	12.5 (12-13)
<i>Salpinctes g. proximus</i> :					
1 adult male, San Martin Island, Lower California	69.5	53.8	20.5	21.5	14
<i>Salpinctes o. obsoletus</i> :					
10 adult females, mainland of southern California	68.6 (67-72)	50.2 (48-53.5)	18.2 (16.8-19)	20.6 (19.8-21.5)	13.8 (13.5-14.5)
3 adult females, Santa Cruz Island, California..	67.4 (66-69.2)	50.8 (49-53.5)	16.9 (16.8-17.2)	20.3 (19.5-21)	13.4 (12.2-14.5)
2 adult females, San Clemente Island, California (68-63.5)	68.2 (68-63.5)	50.2 (48.5-52)	17.7 (17.5-18)	20.7 (20-21.5)	13.6 (13.2-14)
1 adult female, Santa Barbara Island, California	68.5	52.5	17.5	20	14.2
1 adult female, Santa Catalina Island, California	67	52	18	20	14
1 adult female, Coronado Islands, Lower California	71	50.5	18	20.8	14
1 adult female, San Benito Island, Lower California	69	50	18.8	21	14
2 adult females, Ildefonso Island, Lower California	67	47.7 (46-49.5)	17.6 (16.8-18.5)	20 (19.8-20.2)	13.9 (13.8-14)
<i>Salpinctes o. pulverius</i> :					
6 adult females, San Nicolas Island, California.....	68.1 (66-70)	48.8 (46-50.2)	18.4 (17.5-19.5)	20.7 (19.5-22)	14.4 (13-15.5)
<i>Salpinctes g. guadeloupensis</i> :					
2 adult females, Guadalupe Island, Lower California	64.7 (64.5-65)	47 (44.5-49.5)	21.1 (20.5-21.8)	20.6 (20.5-20.8)	12.9 (12.8-13)

culmen. No mainland bird was found with length of culmen equal to the maximum of San Nicolas Island specimens.

Twenty-two examples of *pulverius* in juvenal plumage are quite indistinguishable from young birds from the mainland. There is not the slightest tendency toward the development of any differential features at this stage, such as are so conspicuous in the young *Salpinctes guadeloupensis*.

To sum up, it seems apparent that the only distinctive feature of the San Nicolas Island Rock Wren is the slightly greater average length of culmen. In neither adults nor young are there any characters of color or markings not included in the range of variation found in the mainland bird. It seems advisable to recognize the slight size difference shown in the island series by the use of a separate name, *pulverius*, as has been done, but the name should be restricted to the birds from San Nicolas Island. Specimens at hand from others of the Santa Barbara Islands in every respect fall within the range of variation of *S. obsoletus obsoletus*.

In the spring of 1912 Mr. George Willett made a small collection of birds on certain of the islands off the coast of northwestern Lower California. These form part of his collection now on deposit at the Los Angeles Museum of History, Science and Art. Among the specimens collected on this trip is a single adult Rock Wren from San Martin Island; and it is rather startling to find that this bird is radically different in appearance from the mainland *Salpinctes obsoletus*, and but slightly distinguished from *S. guadeloupensis*. This wren I propose to call:

***Salpinctes guadeloupensis proximus*, new subspecies**

San Martin Island Rock Wren

Type.—Adult male; San Martin Island, Lower California; April 10, 1912; collected by George Willett; original number 1150.

Characters.—In coloration most nearly like *S. guadeloupensis guadeloupensis*. Dark brown, as in that race, and with the back rather heavily barred. The most apparent color difference between the forms is that in *proximus* the outer webs of the tertials, secondaries, and some of the primaries, are rather conspicuously barred, as in some examples of *obsoletus*, while in the five adults at hand from Guadalupe Island, they are almost or quite uniform. As regards measurements, *proximus* has the long, heavy bill of *guadeloupensis*. It has not the relatively short wing and tail of the latter race, but in these measurements is more nearly like the mainland form.

Remarks.—It is not without reluctance that I have decided to attach a name to this supposed island race, for I am aware of the objections that might be made to such a course. San Martin is only about six miles from the mainland. It is of small size, its area comprising but a few square miles, and it is at a comparatively remote distance from Guadalupe. However, similar apparent anomalies in distribution are known among other animals of insular distribution on the Pacific coast of North America; and, conceding the peculiarities of range and the limited material available, this single specimen still hardly admits of any other treatment. Its characteristics are absolutely unlike *S. obsoletus*, and point as definitely toward *guadeloupensis* in affinities. This is the more striking in consideration of the uniformly *obsoletus*-like character of the Rock Wrens of other islands, some near and some remote from San Martin.

It may be urged that it is sufficient to point out the peculiarities of such a specimen, without attaching a new name to it, but it is doubtful if such procedure emphasizes the case sufficiently. In depending upon research and collecting in the future it is far more likely that a definite "type locality"

will attract attention, than that a statement of probable affinities will be remembered from one out of a mass of papers.

Although it is of course a matter of regret that there is but one specimen of this island subspecies at hand, I believe that the appearance of this single bird justifies the naming of the race to which it belongs. Although there is great variation shown in series of *Salpinctes obsoletus*, both as regards shades of gray or brown, and character of spots, bars, or streaks, on various parts of the plumage, this specimen stands absolutely outside of this range of variation, so that I do not believe that there is any question of its belonging to this species. From *guadeloupensis* it is not so readily distinguished, at least as regards color, but the measurements lie outside the limits reached by that form. As in its variation from typical *guadeloupensis* there is an apparent approach toward the characters of *obsoletus*, it might be considered as illustrating intergradation between the two, but for the present at least, in view of the many peculiarities of distribution observed in the genus, it seems best to consider *obsoletus* and *guadeloupensis* as distinct species.

We are probably safe in assuming that the Rock Wrens of all the islands off the coast of California, as well as those of most of the Lower California islands, are derived from the mainland form *Salpinctes obsoletus*. In fact, in most cases they are not to be distinguished, though it does seem to me that in the island birds throughout there is to be detected a slight general tendency toward lengthening of culmen. In the Santa Barbara group this tendency has reached, on San Nicolas, most remote from the mainland, a stage where we are perhaps justified in recognizing the variation in nomenclature, and considering the San Nicolas Rock Wren as a separate subspecies. There is another slightly differentiated island form of *obsoletus*, *S. o. exsul* (not seen by me), from San Benedicto Island, of the Revillagigedo group, off the coast of western Mexico. Of additional island localities there are at hand specimens from most of the Santa Barbara islands, and from the following Lower California islands: The Coronados, San Benito, Cerros and Ildefonso. None of these are to be distinguished with certainty from typical *S. obsoletus*.

Thus there is on the mainland coast of California and Lower California, and on most of the adjacent islands, the Rock Wren, *Salpinctes obsoletus*, in its three very slightly distinguished races, *obsoletus*, *pulverius* and *exsul*. In the midst of this general range there is found on two islands, Guadalupe and San Martin, a sharply differentiated form, *Salpinctes guadeloupensis*, apparently divided into two races, *guadeloupensis* and *proximus*. Bearing in mind the above facts as regards distribution, and also the degree and kinds of difference distinguishing the forms, it seems to me that in the light of our present limited knowledge of the subject, it is best to regard *Salpinctes obsoletus* and *S. guadeloupensis*, as distinct species, the first composed of several, the second of two, different forms or subspecies. In other words, it is the treatment accorded these forms in the A. O. U. Check-List (1910, p. 336) that seems to me the more reasonable, rather than the view expressed by Ridgway (1904, pp. 643-653) in his recent study of the group. At the same time recognition must be accorded the possible significance of the peculiar juvenal plumage of *Salpinctes obsoletus notius* (not seen by me). In this Mexican form the young is described by Ridgway (1904, p. 648, footnote) as being similar to the corresponding stage of *guadeloupensis*, and this may be an indication of close relationship between these two forms, though the geographical position of *notius* adds no emphasis to such a theory. The

southern Mexican and Central American forms of this genus are so imperfectly known and understood, however, that any general treatment of the genus must be at this time regarded as tentative, and for the present it seems best to consider *obsoletus* and *guadeloupensis* as specifically distinct.

Specimens examined.—*Salpinctes o. obsoletus*: Nevada, 22; Arizona, 18; Oregon, 1. Mainland of California: Modoc County, 17; Amador County, 1; El Dorado County, 1; Alameda County, 2; Tehama County, 2; Kern County, 9; Tulare County, 2; Fresno County, 1; Ventura County, 2; Los Angeles County, 46; San Bernardino County, 30; Riverside County, 13; San Diego County, 1; Colorado River between Needles and Yuma, 9. Island localities: San Clemente Island, 4; Santa Catalina Island, 2; Santa Barbara Island, 8; Santa Cruz Island, 6; San Miguel Island, 2; Coronado Islands, Lower California, 5; San Benito Island, Lower California, 1; Cerros Island, Lower California, 1; Ildefonso Island, Lower California (east coast), 6. *Salpinctes o. pulverius*: San Nicolas Island, California, 34 (12 adults, 22 juveniles). *Salpinctes g. guadeloupensis*: Guadalupe Island, Lower California, 6 (5 adults, 1 juvenile). *Salpinctes g. proximus*: San Martin Island, Lower California, 1 adult. Total number of specimens, 253.

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Los Angeles, California, July 18, 1914.

A SURVEY OF THE BREEDING GROUNDS OF DUCKS IN CALIFORNIA IN 1914

By HAROLD C. BRYANT

WITH NINE PHOTOGRAPHS BY THE AUTHOR

(Contribution from the University of California Museum of Vertebrate Zoology*)

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INTRODUCTION

In connection with a study of the game birds of California now being made by Dr. Joseph Grinnell and the writer under the auspices of the University of California Museum of Vertebrate Zoology, the opportunity was taken the past spring to investigate the more important breeding grounds of ducks within the state of California. The purpose of the undertaking was to determine the kinds and numbers of ducks and certain other native game birds nesting within the state and also to obtain all possible knowledge as to the present conditions under which they breed. The limited amount of information upon record as to past conditions shows the importance of securing definite data concerning conditions as they are right now. That this information may be available as needed in the future has been the prime incentive in this work.

The writer and his assistant, Mr. John N. Kendall, left the Museum on May 11, 1914, for Los Baños, Merced County. Here we stayed till May 24 when



Fig. 62. WHERE DUCKS NEST; NEAR LOS BANOS, MERCED COUNTY, CALIFORNIA; MAY 18, 1914.

we moved to Live Oak, Sutter County, and spent the 25th near there on the grounds of the Noyes Gun Club. The next three days we studied conditions in the vicinity of the Gridley Gun Club across the line in Butte County. May 29 we left for the Klamath region, arriving at Klamath Falls, Oregon, the same night. The marshes along Link River were investigated on May 30. From here we staged to Merrill, Oregon, and camped the following three days on Colwell's ranch at the mouth of Lost River. On the third of June we moved camp to White Lake, a former town-site about three-quarters of a mile north of the California-Oregon line. On June 6 we drove twenty-two miles around the south end of Lower Klamath Lake to the mouth of Willow Creek near Brownell, Siskiyou County, California. Here we camped until leaving for home on June 10.

We were thus enabled to visit three of the best known breeding grounds of ducks in the state: the vicinity of Los Baños, in the San Joaquin Valley; the vicinity of Gridley, in the Sacramento Valley; and the famed breeding grounds of the Klamath Lake region.

LOS BANOS, MERCED COUNTY, CALIFORNIA

Our stay at Los Baños covered a period of nearly two weeks, May 11 to May 24. We were quartered at the club house of the Los Baños Gun Club situated at Gadwall, six miles southeast of Los Baños. Here we were in the heart of the best duck country and found conditions favorable to our work.

Practically all of the land in the vicinity of Los Baños is owned by the Miller and Lux Company. By taking water from the San Joaquin River near Mendota and carrying it northward along the hills in two large canals this company has brought large areas of land under irrigation. All of the sections of land which are at all level have been enclosed in levees and are successively flooded so as to cause a continual growth of grass on which cattle are pastured. About 150,000 head of cattle are pastured on this "swamped land" in the vicinity of Los Baños. The water in flooded fields varies from a few inches to about four feet deep. In the shallower places sedge (*Carex* sp.), rushes (*Juncus* sp.), and salt grass (*Distichlis spicata*) spring up, whereas tules (bulrushes and cattails) grow in the deeper parts. The commonest aquatic plant is the yellow water-weed (*Jussiaea californica*). The higher portions of land which cannot be flooded are covered with Kern greasewood (*Spirostachys occidentalis*). A few sloughs lined with tules carry the surplus water off towards the river.

We find, therefore, that these breeding grounds for ducks and other birds have been made available through the efforts of man to produce pasturage for cattle. The country is especially well suited to those ducks which choose small sedge-covered islets (see fig. 62) or dense clumps of tules in which to nest.

For many years this region has been known as the best of the duck breeding grounds in the state, as well as the best of the loafing grounds for waterfowl during the winter. This has been the region where market hunters have most persistently operated. Its distance from the larger cities has alone prevented its more wide use for gun club preserves. It has also long been the Mecca of those ornithologists and oologists who were most interested in waterfowl. In spite of the activities of such men, however, little has been written as to the results obtained. The best account of the ornithology of this region yet published is to be found in F. M. Chapman's "Camps and Cruises of an Ornithologist" in which an altogether too brief chapter is devoted to "The San Joaquin Valley at Los Baños". This one account affords information as to previous conditions (in 1903) in this locality.

Anas platyrhynchos. Mallard. We personally saw but a very few Mallards in the vicinity of Los Baños, though we were told that the species nests in some numbers along the larger sloughs near the river. We discovered no nests, but succeeded in finding two broods of young. On May 12 while crossing a foot bridge across a slough I frightened from a nearby clump of tules a female Mallard with a brood of half-grown young. Some of these dove, while others flopped along the surface of the water. This brood was thought to be at least two weeks old and the eggs must therefore have been laid about the first week in April. A day or two later what was probably part of the same brood was seen in the same locality. On May 18 a female Mallard with a brood of about ten downy young, seven or eight inches long, was noted scurrying across

a bit of open water in a large pond. As soon as the young were securely hidden in a growth of sedge the mother flew over towards us and attempted to distract our attention. Although we searched the patch of sedge carefully we were not able to locate any of the young. Another brood of downy young was reported to us. All of the evidence obtained points to the conclusion that, even so early as the middle of May, many Mallards were already through nesting. The downy young are much like those of the Cinnamon Teal, but can be distinguished by the presence of more yellow on the sides of the head and by the broader bill.

Dafila acuta. Pintail. Four nests of the Pintail were examined. One found on a small islet had been destroyed by some animal, for the broken egg shells were found scattered about. Another nest found had been trampled by cattle. On May 22 a Pintail was seen to flush from her nest as an automobile passed by. The nest was situated about twenty yards from the nearest water and but forty feet from the main county road. It was but poorly concealed, being surrounded by salt grass only about six inches high. The nest, contain-

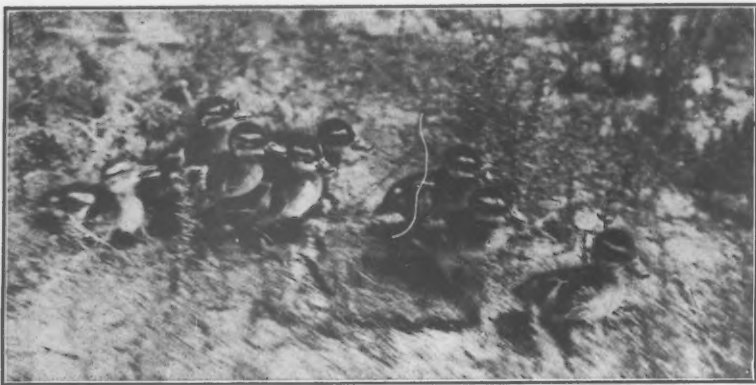


Fig. 63. Downy young of Pintail (*Dafila acuta*); Los Banos, May 21, 1914.

ing seven fresh eggs, was constructed of short grass stems and sparsely lined with dark-colored down. On returning to this nest on the morning of the 24th we found that some animal had been there before us. Only four whole eggs remained, while broken and empty shells were scattered about (see fig. 70). The fourth nest was reported to us as containing eight fresh eggs on May 23, and as being located in salt grass within fifty feet of the margin of a large pond.

In all, three broods of the Pintail were found in this locality. The first brood was discovered along with the mother in some shallow water near a tule-grown slough. The downy young all at once started for the shelter of the tules, while the mother flopped into the water not more than ten feet away from me and did her best to lead me in another direction. The brood numbered seven or eight individuals about nine inches long though there was considerable variation in size. On May 21 a Pintail with ten downy young was discovered on the bank of a pond. When first disturbed she was brooding her young on dry ground about ten feet from the water. The moment she flew the downy young assumed rigidly the same poses they had variously held be-

neath the mother. Some were standing nearly erect whereas others were crouching, but all were huddled close together. They remained perfectly motionless while, leaving Kendall to watch, I went for the camera. I had gone over a hundred yards before they moved. By the time I returned they had



Fig. 64. NEST OF BLACK-NECKED STILT (*Himantopus mexicanus*): A CRUDE AFFAIR BUILT FLAT ON THE GROUND; LOS BAÑOS, MAY, 1914.

wandered off about ten yards. They marched in single file and every now and then huddled close together posing motionless for a few moments. The mother came within twelve feet of us a number of times. She repeated from time to time a sonorous *quack*; but when we moved to a little distance she approached the ducklings and began calling them with a rapid series of short quacks, to which the young responded by quickly following their mother as she waddled off to the nearest water. Another brood of almost the same age was discovered on the afternoon of the same day, the 21st (see fig. 63). The wind was blowing hard and the mother with her eight downy young had sought the shelter of a bush on the bank of a large pond. She was very solicitous for her young, and in her attempt to lead us away she fluttered along the ground, flew about our heads, or swam in anxious manner in the nearby pond.

The Pintail evidently nests commonly in the vicinity of Los Baños. The almost equal number of sets of fresh eggs and broods of downy young found lead us to conclude that our visit there occurred during the height of the breeding season. The downy young have so little yellow about the head, and the two dark lines on the side of the head are so conspicuous, that there is little trouble in distinguishing them from the downy young of the Mallard or Cinnamon Teal. Like the young of the Mallard the young Pintail is an expert diver. Two kept for a time in captivity were very fond of house flies and were

wandered off to the nearest water. Another brood of almost the same age was discovered on the afternoon of the same day, the 21st (see fig. 63). The wind was blowing hard and the mother with her eight downy young had sought the shelter of a bush on the bank of a large pond. She was very solicitous for her young, and in her attempt to lead us away she fluttered along the ground, flew about our heads, or swam in anxious manner in the nearby pond.



Fig. 65. NEST OF BLACK-NECKED STILT: A WELL CONSTRUCTED EXAMPLE, BUILT UP WELL ABOVE SURFACE OF WATER TO ESCAPE FLOODING; LOS BAÑOS, MAY, 1914.

extremely adept in catching the insects as dropped into the cage. The stomachs of the young Pintails examined contained grass and other plant stems, seeds of filaree (*Erodium*) and certain other unidentified seeds in fragments. One stomach contained the remains of the pupa of some insect.

Chaulelasmus streperus. Gadwall. Four nests of the Gadwall were found. From one of these the young had already hatched, and one of the others had been raided by some animal, probably a coon. On May 12 a female of this species was flushed from her nest which was situated in tall salt grass about fifteen feet from a small pond and lined with gray down. It contained nine cream-colored eggs. When flushed the duck gave a few quacks, dropped into the nearby pond and, swimming low in the water, quietly departed. Five days later the nest was destroyed by some animal. On a small island grown up with sweet clover and grass the fourth nest was found on May 16. This nest was constructed of the leaves of sweet clover mixed with dark gray down and was well concealed by the high growth. The outside diameter was 21 inches and the inside 16 inches. The nest contained twelve slightly incubated eggs. No downy young were found by us.

Besides the two birds which were flushed from their nests, not more than two or three other Gadwalls were identified with certainty in the field. Hence we must consider this species as comparatively uncommon during the nesting season in this vicinity. The number of nests found did not furnish in this case an adequate criterion of the number of nesting birds of the species. The birds when flushed remind one of Pintails but appear to be of stockier build and much shorter neck. The eggs differ from those of the other ducks found nesting at Los Baños in that they are of a distinct cream color. The stomach of one adult examined contained one carabid beetle and a quantity of grass blades. The stomach contents was very similar to that usually found in the Baldpate.

Querquedula cyanoptera. Cinnamon Teal. Twenty-three nests of the Cinnamon Teal were found. Of this number eighteen were destroyed by some predaceous animal, and from three, the young had already hatched. This duck almost invariably chose for nesting sites small islands or the banks of ponds upon which grew either sedge or salt grass. A typical nest found on an islet in a marsh was well concealed in a patch of bunch-grass about a foot high. It was well lined with down in spite of the fact that the eleven eggs were fresh. Two other nests discovered, which were afterward destroyed through some agency, were exactly the opposite in respect to the equipment of down: one containing five eggs held no down as yet, the other containing but one egg showed a moderate lining of down. A nest found in a dense clump of tules at the edge of a pond contained one egg when first found. Four days later the same nest contained five eggs, giving evidence that one egg is laid each day. It is interesting to note that two individuals of the same species will choose such different nesting sites as grassy islands and dense tules, and such different nesting materials as grass and tules. The choice of tules by Cinnamon Teal in the vicinity of Los Baños is certainly the unusual thing.

The inconspicuousness of a nest when covered with its blanket of down was significantly impressed upon us on returning to a nesting site we had previously marked. Although we went directly to the small islet on which the nest was situated and looked carefully for the nest it took several minutes to descry it, and when found it was in exactly the position we had pictured it in our minds. The dusky-hued down of the Cinnamon Teal harmonizes wonder-

fully with the damp black earth on which the nest is most often directly placed.

Four broods of downy young Cinnamon Teal were seen, and a "flopper", about half-grown, which represented another brood, was noted. In no case did the broods number more than eight and most of them numbered six or seven. The downy young look much like those of the Mallard, both species having extensive yellow on the sides of the head. In the specimens of Cinnamon Teal at hand, however, the dark-colored stripes on the sides of the head are not so conspicuous and the stripe between the base of the bill and the eye is indistinct. The bill, too, is narrower. The broods were invariably found along the marshy margins of ponds, these constituting their preferred forage grounds. The stomach of a young one contained parts of one seed which was so ground up that identification was impossible.

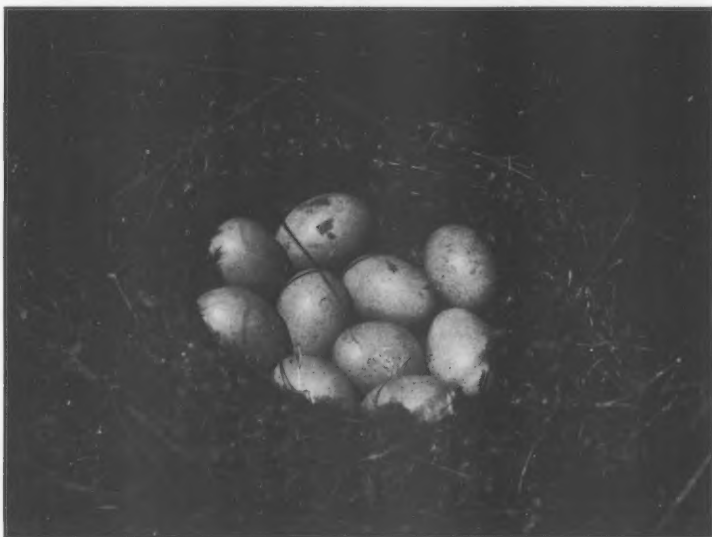


Fig. 66. NEST AND EGGS OF PINTAIL (*Dafila acuta*); NEAR PENNINGTON, SUTTER COUNTY, CALIFORNIA; MAY 25, 1914.

The Cinnamon Teal is the commonest duck at Los Baños during the summer. In a three hours walk an average of twenty individuals could be counted. During the period of our stay, by far the greater majority were seen in pairs, and this seems to show that many had not yet begun to nest. In several instances males were observed paying court to females, and in one case a fight between two males was witnessed. Combatants, swimming on the water, would face each other about a foot apart, and make lunges at each other, using both bill and wings as weapons. Occasionally one of the birds would avoid attack by diving, allowing the other to jump completely over him. Cinnamon Teal were the tamest of the ducks found in this vicinity. Occasionally a person could approach within twenty feet of a feeding pair. The male is apparently silent; the female is the one which quacks and is always the first to take alarm and fly.

***Erismatura jamaicensis*.** Ruddy Duck. Ruddies were commonly seen in pairs in the deeper sloughs and larger ponds near patches of tules. A nest containing four eggs was found on a small sedge-covered island on the rim of an earth duck blind. The nest was simply a crushed-down place in the sedge, there having been no obvious attempt to make use of building material. There was a very little lining composed of large whitish down-feathers. Very little attempt at concealment could have been made in this case, for the large white eggs were in plain sight when the nest was still eight feet from the observer. A pair of Ruddies was nearly always to be seen near the nesting site. The facts that this species was nearly always seen in pairs and that we found only the one nest, and that one with an incomplete set, led us to believe that the season of nesting with the Ruddy Duck was not yet well under way.

***Dendrocygna bicolor*.** Fulvous Tree-duck. One of our most interesting finds was a nest of the Fulvous Tree-duck, discovered on May 12, 1914. The nest was situated on a hummock in the middle of a marsh between two ponds. The nest was a well-woven one of dry sedges placed about six inches above the ground in a tall clump of sedge and weeds. The cavity was about five inches deep and in it lay twelve ashy white eggs. A few days later the nest was raided by some predaceous animal and all the eggs destroyed. On May 18 we discovered a second nest in the same swamp. This one was built about six inches above the water in a small clump of sedge and contained but four eggs. The sedges were arched over the cavity in such a way as to conceal it effectively. Two days later when we visited this nest we found it also raided. The only other nest of this species noted was a new one found on June 23. No attempt had been made at special construction of a nest, the two eggs simply lying in a crushed-down place among tall sedges.

Fulvous Tree-ducks were much more numerous at the end of our stay than at the beginning. The last few days several small flocks were seen and these may very probably have been new arrivals. In a large flooded field several Tree-ducks were flushed but no nests were found. It seems certain that the nesting season for this species had but just begun. Compared with the numbers of Fulvous Tree-ducks seen by the writer in the same locality on July 16, 1912, the numbers summering here now would seem to be less, even considering the fact that many seen in 1912 were young.

The gizzard of an adult Tree-duck taken contained finely trituated grass and other vegetable matter.

Other ducks.—A pair of ducks swimming about at the edge of some tules in a large pond proved to be Green-winged Teal. The male was a cripple and unable to fly and probably the female was also. This male bird had been feeding on the seeds of sedge (*Carex* sp.). More than one hundred seeds were found in the gizzard.

Redheads (*Marila americana*) are known to nest in some numbers in the vicinity of Los Baños, but we were not successful in locating a nest ourselves. On one large pond surrounded by tules we found on several different occasions seven Redheads, four males and three females. During a morning's trip to some large tule-bordered ponds about twenty Redheads were seen. These birds seemed to be in pairs and there were usually more males than females seen, which led us to think that some of the females might be incubating.

Shovellers (*Spatula clypeata*) were even less common birds than Redheads. Pairs were occasionally seen feeding in shallow, muddy ponds out in the brush, and on one occasion three full-plumaged males were seen disporting themselves

in a little open water near a dense growth of tules. Attempts to locate a nest of this species proved unavailing.

Fulica americana. Coot. Next to Black-necked Stilts, Coots were the most numerous nesting birds in the vicinity of Los Baños. A record was kept of the general location of each nest found, material used in construction, and the numbers of eggs. On our arrival May 11 many new nests were found nearing completion. On our departure most of the nests contained eggs. We were therefore led to believe that the nesting season was fully inaugurated by the middle of May. Only five broods of young were noted during our stay at Los Baños, while more than fifty nests were found.

RECORD OF COOT'S NESTS FOUND AT LOS BANOS

Location	Material	Date	Number of eggs
1. In sedge	Sedges	May 13	6
2. " "	"	" 14	9
3. " "	"	" "	9
4. In tules	Tules	" "	3
5. In dock weed.....	Sedges	" "	5
6. At edge of tules.....	Tules	" 16	3
7. On aquatic plant.....	Sedges and aquatic plant	" "	5
8. In tules	Tules	" "	6
9. In wire grass.....	Sedges	" "	6+1 young
10. On aquatic plant.....	"	" "	4
11. In low tules.....	Tules	" 18	4
12. In tules	"	" "	9
13. In sedge	Sedges	" "	4 (2 pipped)
14. " "	"	" "	8
15. " "	"	" "	1 (pipied)
16. " "	"	" "	1+others hatched
17. " "	"	" "	8
18. " "	Tules	" 19	10
19. " "	"	" "	8
20. " "	"	" "	9
21. In tules	Sedges	" "	6
22. In sedge	"	" 20	5 (2 pipped) + 1 young
23. " "	"	" "	7
24. In tules	Tules	" "	2
25. " "	"	" "	4
26. " "	"	" "	3
27. In sedge and weeds.....	"	" "	8
28. In tules	"	" 22	6
29. In sedge	Sedges	" "	1
30. " "	"	" "	8
31. " "	"	" 23	1
32. " "	"	" "	8
33. " "	"	" "	8
34. " "	"	" "	8
35. On aquatic plant.....	"	" "	9
36. In sedge	Aquatic plant	" "	1
37. " "	Sedges	" "	6
Total			37
Number of additional new but empty nests found			16
Number of nests with all eggs hatched.....			2
Grand total			55

Plegadis guarauna. White-faced Glossy Ibis. During our stay large flocks of White-faced Glossy Ibis were seen both feeding and in flight. The numbers appeared to be greater toward the end of our visit. Several of the flocks in which the individuals were counted numbered thirty to forty. From their actions we inferred that they had not yet begun nesting.

Shore-birds.—Black-necked Stilts (*Himantopus mexicanus*) were by far the most numerous of all the breeding birds in the vicinity. They nested very commonly on muddy islands in the larger ponds; but nests were also found along the margins of ponds out in the brush as well as in flooded fields. In such places as last indicated the nests had often been built up so as to reach above the surface of the water. It was suggested to me some time ago by Mr. Paul J. Fair that Stilts alone among all the water birds, seem to have sufficient intelligence to increase the height of the nest in order to keep it from being flooded by rising water. Mr. John G. Tyler attests to the same thing. Evidence which we obtained certainly points in this direction. On the banks of ponds and on muddy islands the nests were usually very simple in structure, being a hollow in the ground lined with a few weed stems. Many nests found above water may well have been of this crude structure before the encroachment of the water. When seen by us, however, they were well constructed nests built up to a height of six to ten inches (see figs. 64, 65). It seems quite possible that extra layers of stems could be added to the nest as it and the eggs were threatened with flooding by the rise of the water. Two nests in which the young were just hatching were noted May 21, but all the rest of the nests contained three or four eggs. Fresh eggs were examined on May 22.

Avocets (*Recurvirostra americana*) were still more partial to the muddy island than were the Stilts. The former were present in moderate numbers, and a nest containing three eggs was found on May 23. A wry young one several days old was noted on May 21 swimming in a shallow pond and turning tail up as it tried to reach something on the bottom. Its stomach was found to contain eight or more small water beetles (*Dytiscidae*), 1 Jerusalem cricket (*Stenopelmatus*), 1 larva of a dragon-fly, 1 small bug (*Pentatomidae*), and 1 centipede (*Scolopendra*).

Along the muddy shores of ponds five Snowy Plover (*Aegialitis nivos*a) were seen at different times. Three were noted on May 17. Their light brown backs so harmonize with the color of the muddy shores of ponds that it is impossible to see the birds until they move. The stomach of one contained more than ten water beetles (*Dytiscidae*). These birds were very tame and a photograph was taken at a distance of eighteen feet.

A flock of twenty-six Western Sandpipers (*Ereunetes mauri*) was noted on May 17 and two Northern Phalaropes (*Lobipes lobatus*) on May 19.

Killdeer (*Oxyechus vociferus*) nested most commonly on the alkali flats away from the water. When one walked across such stretches as many as ten of these birds could be seen running along ahead or standing "teetering" and incessantly repeating their call. The eggs in one nest found May 15 had been broken on the under side, just as if the weight of the bird, pressing the eggs against the small pebbles forming the floor of the nest, had crushed in the shell. Another nest found on May 15 was unique in the facts that it was placed on a small grassy knoll surrounded by water, and that the cavity was well lined with short stems of devil grass. A downy young one was found May 22.

GRIDLEY, BUTTE COUNTY, CALIFORNIA

One day, May 25, was spent on the Noyes Gun Club grounds in Sutter County, just west of the Marysville Buttes. The next three days we camped on the grounds of the Gridley Gun Club in Butte County, which joins the Noyes Club on the north. Where Butte Creek enters the Sacramento River bottom it divides into a number of sloughs, and during high water large areas of the adjacent lowlands are flooded. The sloughs are lined with reeds and tules in which Mallards and Shovellers are known to nest. A growth of timber along the creek affords nesting sites formerly occupied, as we were told, by Wood Ducks, while the grass-covered flats near the sloughs furnish nesting sites for Cinnamon Teal and Pintail. Northwest of the Marysville Buttes are extensive mud flats covered with grass. During migrations these flats become loafing grounds for geese, and it is here that geese are said to be seen at the proper seasons in greater numbers than anywhere else in the State. During the late spring and summer these same flats furnish excellent breeding grounds for such ducks, like the Pintail, which nest at some distance from water. Abundant food is to be found in the nearby sloughs and ponds where there is heavy plant growth.

Anas platyrhynchos. Mallard. A nest well concealed in tall sedge and found on a small island on May 26 contained one infertile egg and egg-shells from which the young had hatched. A brood of young discovered on the 25th were fully ten inches in length and the primary wing-feathers were just starting. Members of another brood, found on the 27th, were not more than seven inches in length. When diving to escape capture they would often cling to the weeds beneath the surface, and when finally forced to come to the top for air would expose to view the top of the bill only. They tried to escape by simply diving and clinging motionless to weeds more often than they attempted to swim long distances under water.

Mallards were the commonest ducks in the vicinity of Gridley. Most of them were seen in pairs, but not a few lone males were noted. Hatched egg-shells and broods of downy young showed that many of this species were already through nesting. Those seen in pairs were doubtless the latest of the nesters.

Dafila acuta. Pintail. While crossing some grassy fields the auto in which we were riding startled a Pintail from her nest situated within two inches of the wheel tracks. The nest was typical, being built of grass and lined with down. It contained ten eggs (see fig. 66). Although we dragged with a rope several acres in the vicinity of this nest we were not able to locate another. A shepherd told us that he had discovered a number of nests to the westward of this place. From the numbers seen the Pintail must be a fairly common nesting duck on the "goose grounds".

Querquedula cyanoptera. Cinnamon Teal. In this vicinity I should say that the Cinnamon Teal ranked about third in abundance, the Mallard coming first and the Pintail second. But one nest was found. This contained nine fresh eggs and was situated on the same island on which the Mallard's nest with hatched eggs was found and only about six feet from the latter. The nest was unusually well concealed in tall sedges, there being an arched runway from the water to the nest, the distance being but little more than one foot. There was no down, or other lining.

Other ducks.—A number of Shovellers (*Spatula clypeata*) were seen, but

no nests or young were found although the tules were carefully searched. Fulvous Tree-ducks appeared to be wholly absent. Not a single Ruddy was seen, and no Wood Ducks. Two or three Coot's nests were found, but we did not find this bird nesting abundantly in this locality.

Shore-birds.—Five or six Black-necked Stilts (*Himantopus mexicanus*), which did not act as if they were nesting, one Killdeer, and a small flock of Western Sandpipers, were the only shore-birds seen. Apparently the conditions are nowhere near as ideal in this locality for nesting shore-birds as they are at Los Baños.

LINK RIVER, KLAMATH COUNTY, OREGON

Link River is the outlet from Upper Klamath Lake. Extensive tule swamps and marshes line the river for miles. This locality, where we spent but one day, May 30, proved to constitute about the best breeding ground visited



Fig. 67. NEST OF COOT (*Fulica americana*) CONTAINING EIGHT EGGS OF THIS SPECIES AND ONE EGG OF THE REDHEAD (*Marila americana*); TULE LAKE, NEAR MERRILL, KLAMATH COUNTY, OREGON; JUNE 2, 1914.

during the whole trip. In the tule-bordered ponds Mallards, Redheads, and Ruddies were extremely abundant. On one pond alone we counted over seventy-five ducks.

Anas platyrhynchos. Mallard. The Mallard was the most abundant duck seen and without doubt the commonest nester. A brood of downy young was met with on May 30 at the margin of a pond. They disappeared so quickly by diving that it was impossible to count them.

Marila americana. Redhead. Redheads were far more numerous in this locality than at Los Baños or Gridley. On one small pond a brood of about ten very small downy young were seen swimming along behind their mother. She led them into some tules where they successfully eluded our search for them. In color the small downy young are a dark reddish brown, a character which enables one to distinguish them at a distance.

Shore-birds.—Two or three pairs of Avocets (*Recurvirostra americana*) were seen and one nest was found. This was placed in the middle of a grassy island. Killdeer (*Oxyechus vociferus*) were common nesters in the vicinity, and a man reported that he had seen several downy young. Around one pond were about fifteen Stilts which behaved as though nesting.

TULE LAKE, OREGON AND CALIFORNIA

Tule Lake is surrounded by lava beds, and lacks the needed growth of vegetation on its shores to make it a favorable nesting ground for ducks. Along the north shore, near the mouth of Lost River, in Oregon, there is some marsh land and a good growth of tules; but on the other sides of the lake sage-covered lava hills rise abruptly from the water's edge. Even under such circumstances, Mallards are reported to nest, selecting sites out in the sage brush away from water. While in this locality, June 1 to 3, we camped on



FIG. 68. NEST OF REDHEAD CONTAINING SIX EGGS OF THIS DUCK AND ONE EGG OF THE RUDDY DUCK (*Erismatura jamaicensis*); TULE LAKE, OREGON; JUNE 2, 1914.

Colwell's ranch near Merrill, Oregon, at the mouth of Lost River. From this point we were able to work the north shore in Oregon and the west shore over the line in California.

Anas platyrhynchos. Mallard. Numbers of Mallards undoubtedly breed along the northern shore. Several lone males and a few pairs were seen, but no nests or young were found.

Marila americana. Redhead. In this vicinity Redheads appeared to be more common than Mallards. Flocks of seven to ten were often observed in open places between the tules. A nest newly constructed of green tules contained no eggs; but several feathers in it were certainly those of a Redhead. On June 2 we found a Coot's nest which contained a set of eight eggs of the Coot and one egg of the Redhead (see fig. 67). On the same day we found a nest of a Redhead with six eggs of this duck and one egg of the Ruddy (see fig. 68). The nest was a platform of dried last-year's bulrushes fixed among

standing rushes about six inches above the water. Some gray down-feathers, larger in size, if anything, than those of the Mallard, were in the nest, but the bird had evidently only started to provide the lining. Additional evidence of the well-known fact that Redheads and Ruddies on occasion lay their eggs in other ducks' nests is thus afforded.

Querquedula cyanoptera. Cinnamon Teal. A few Cinnamon Teal were seen at the head of Tule Lake. A female was flushed from her nest in the middle of a muddy peninsula on June 1. The nest was a depression lined with broken stems of tules mixed with a quantity of down, and was poorly concealed in a sparse growth of weeds. It contained nine eggs.

Erismatura jamaicensis. Ruddy Duck. About eight individual Ruddies were seen during one morning's excursion. A new nest, discovered in a clump of tules where a pair of Ruddies was seen, was thought to pertain to this species. Evidence as to breeding was obtained through the finding of the one egg in the nest of a Redhead, as described above (see fig. 68).

Shore-birds.—Although no nests were found, the actions of Avocets, Stilts and Killdeer showed that they were nesting in the vicinity. Avocets were more abundant than Stilts in this locality. All shore-birds, however, were found in less numbers than at Los Baños.

LOWER KLAMATH LAKE, OREGON AND CALIFORNIA

Our camp on White Lake was situated in an old store building at the former town-site of White Lake. This situation was our headquarters from June 3 to 6, and made possible explorations along the western shore of Lower Klamath Lake as well as on White Lake, in both Oregon and California. On the west side of the lake we camped until June 9 on Taylor's ranch at the mouth of Willow Creek, near the town-site of Brownell, Siskiyou County, California. From this point we made a launch trip eight miles north to Bird Island and Sheepie Lake, but we spent most of our time on the freshwater marshes at the mouth of Willow and Cottonwood creeks.

The eastern and western shores of Lower Klamath Lake are very different from one another in character. The eastern is lined with a dense strip of tules that extends into the lake a distance of five or six miles. Ducks were seen flying about over these tule beds and no doubt nest in them, but we found it impossible to search for nests. It was dangerous to wade and the tules were too thick to permit of using a boat. Judging from experience elsewhere, ducks prefer localities where there are frequent open patches of water rather than unbroken stretches of tule growth. A small lake near the eastern shore of Lower Klamath, known as White Lake, is famed as a favorite haunt for ducks during the migrations. Along its eastern shore there are excellent nesting grounds for the ducks which prefer a growth of tules with open water adjacent. As the hills come down to the lake on the southern shore of Lower Klamath, the water is too deep for an extensive growth of tules. The best nesting grounds which we found were on the western side of the lake, in California, where the small streams entering the lake form extensive marshes. The marshes at the mouths of Cottonwood and Willow creeks are due to artificial interference. Excellent conditions are said to obtain at the mouth of Sheepie Creek also. Only a narrow strip of tules fringes the lake on this side except in the vicinity of Bird Island where there are many tule-covered islands separated by channels of open water.

Anas platyrhynchos. Mallard. The Mallard is apparently the common-

est duck nesting on Lower Klamath. One nest on White Lake was situated under a sage bush about twenty-five feet from a canal. It contained twelve eggs on June 6 (see fig. 69). One found in a marsh on Willow Creek, also on June 6, was placed in a bunch of cane grass on a sage-covered knoll. The nest was well lined with down in spite of the fact that it contained but four eggs. A fifth egg had been broken in the nest. The bird was evidently incubating, for she was flushed a number of times from the nest, and in one instance she had partially covered the eggs with down before leaving. Another nest found in this vicinity, June 7, was placed in an exposed position at the south side of a boat house, the nest rim on one side being in contact with the boards. It contained nine eggs and we were told that the nest had been there for about three weeks. Three broods of downy young were seen and one or two half-grown young were noted in the same general locality on two or three differ-



Fig. 69. NEST AND EGGS OF MALLARD (*Anas platyrhynchos*) IN SAGE-BRUSH; WHITE LAKE, NEAR MERRILL, OREGON; JUNE 6, 1914.

ent occasions. Males were more often seen than females. As many as ten males were counted in one flock. Two males noted were already assuming the eclipse plumage. The green feathers of the head had been replaced by brown feathers.

Marila americana. Redhead. The east side of Lower Klamath Lake abounds in Redheads. More were seen in this locality than anywhere else on the trip. In one flock alone we counted sixteen individuals. In the vicinity of White Lake, Redheads were more common than Mallards. On the west side of the lake the reverse was true. A female closely followed by a brood of small downy young, seen swimming on White Lake June 5, appeared to be of this species.

Querquedula cyanoptera. Cinnamon Teal. A brood of five or six small downy young was seen on a small pond on Willow Creek on June 6. The brood

was accompanied by both the male and the female adults. On nearly every small pond in the vicinity a pair or two of this species was to be noted.

Other ducks.—From observation and evidence obtained from interviews, Shovellers and Ruddies nest in some numbers on Lower Klamath Lake. At the mouth of Willow Creek several male Shovellers were noted and several pairs of Ruddies were seen.

Branta canadensis canadensis. Canada Goose. Our first Honker was noted on the east side of Lower Klamath Lake where we startled it from the shore. While driving around the lower end of the lake on June 6 we saw a bunch of at least ten half-grown young. Only one adult was seen with them, but two broods were probably represented. On June 7 two other broods were seen near the mouth of Willow Creek. One contained four young and the other five or six. Ranchers of the vicinity reported that Honkers nest every spring in the tules bordering the lake and that they are the first of the water birds to nest. Reports agreed that fewer geese nested on the lake this spring than in former years.

Plegadis guarauna. White-faced Glossy Ibis. On June 4 a flock of five or six White-faced Glossy Ibis was seen flying south over Lower Klamath Lake, crossing the line into California. They were close enough so that I could see the long curved bill, and characteristic sailing with wings set.

Fulica americana. Coot. On Lower Klamath, Coots were not as numerous as most of the species of ducks. Less than ten were seen during our whole stay on the lake. On June 9 two or three downy young were noted on a pond at the mouth of Willow Creek.

Shore-birds.—The Wilson Phalarope (*Steganopus tricolor*) was first seen on Link River in Oregon. Later, in the Willow Creek marshes on the west side of Lower Klamath Lake, twenty or thirty birds were observed. On June 8, while crossing a pasture I started up a pair of Wilson Phalaropes from the low sedge. They flew excitedly about my head and soon were joined by four more. After a long search I discovered the nest, which was placed on the ground and was built of sedge stems. The shells of four eggs from which the young had hatched still lay in the nest. Wilson Phalaropes were usually seen in pairs feeding in shallow ponds.

Gallinago delicata. Wilson Snipe. Our endeavors to find the nest of a Wilson Snipe proved fruitless. On every trip into the marshes on Willow Creek we saw and heard these Snipe as they went through their aerial gyrations. The birds fly high in the air and their whole body appears to vibrate as they dash downward for fifteen or twenty feet and it is at this time that the weird sound so often described is heard. The few which were flushed from the grass were easily identified by their erratic flight. In almost every instance after being flushed they started on one of their aerial trips. On two occasions they were heard long after dark.

Oxyechus vociferus. Killdeer. Near the mouth of Willow Creek a Killdeer's nest was found on the shore of the lake on June 9. It was placed in loose sand near a rock which just showed above the general level of the ground. A small depression sparsely lined with dry sticks formed the nest which held four fresh eggs. Mr. C. H. Glaser, a rancher, reported that while hoeing his garden in the near vicinity of this nest he had a few days before accidentally destroyed another nest containing four eggs. On the east shore of the lake, June 4, we discovered a downy young one not more than one or two days old.

It sought shelter in the sage brush, being able to run very fast in spite of its immaturity.

Recurvirostra americana. Avocet. Avocets were nesting on both sides of the lake, but perhaps most commonly on the east side where muddy peninsulas along the edge of the lake furnished desirable nesting sites. Not a single Stilt was seen on Lower Klamath Lake.

NUMBERS OF DUCKS NOW AND FORMERLY

Wherever possible, people resident in the vicinity of the places visited were interviewed with regard to the present status of ducks in each locality as compared with previous conditions. In all instances the evidence so obtained pointed to the fact that the numbers of breeding birds have greatly decreased in the past ten years. Mr. C. H. Glaser, a dependable observer who has been located on the west shore of Lower Klamath Lake for the past fifteen years, says that he has noticed a considerable fluctuation in the numbers of nesting ducks, but that there has been a marked general tendency to decrease. Similar statements were current in the other localities visited. Most of the testimony attributed the decrease of the resident birds largely to the market hunting and excessive shooting formerly carried on during the winter.

MARKET HUNTING

Many people in Los Baños formerly hunted ducks for the market and almost everyone in the town is able to tell of remarkable kills. A Mr. Becker, with whom I talked, told of seeing Sischo, a famous market hunter of the region, kill 400 ducks with six shots. Sischo and two assistants worked up within range by using steers—"bull-hunting", this method is called. Two discharges from a number four, double-barrelled, muzzle-loading shotgun were fired by Sischo at the birds while they were resting on the water; then his two assistants, each armed with the same kind of gun, fired four more shots as the birds were rising. Mr. Becker who had started to hunt in the neighborhood at the time, was presented with twenty-two ducks as a reward for not disturbing the quarry while the "sneak" was being made. It was also commonly reported that this same hunter and an assistant killed 198 geese in ten shots, using automatics.

When market hunting was at its height trained steers used in hunting commonly sold for three hundred dollars each. Since the law went into effect prohibiting the use of trained animals in hunting any other game birds excepting geese, the market-hunter attempts to escape apprehension as a "bull-hunter" in the following way. He hitches two horses to a light cart, one of which is to be unhitched and used as a movable blind. The harness is so adjusted that this horse can be instantly hitched up again should anyone be seen approaching.

In past years Sischo kept camps of men who spent their entire time hunting for the market. In order to ship large numbers of birds, exceeding the daily legal bag limit, he is said to have paid men one dollar a day for permission to use their names in shipping. Judging from reports, this one hunter shipped as high as 500 birds a day to the markets in San Francisco.

A talk with a market hunter who lives on the east shore of Lower Klamath Lake brought forth the statement that fifteen years ago it was possible to shoot 150 ducks a day and then pick only the more desirable ones such as Canvasbacks and Mallards. It would be impossible at the present time to make such records, even if the law permitted.

The above instances well show the awful slaughter which accompanies the operations of the market hunter. In addition, market hunters as a class are the most persistent violators of the game laws. This factor in the decrease of ducks can be eliminated by the passage and enforcement of radical non-sale laws.

LOCAL DISTRIBUTION OF DUCKS IN CALIFORNIA

The investigation showed a distinct variation in the numbers of the different species of ducks from north to south. Whereas the Mallard was one of the less common nesting ducks at Los Baños, it was the commonest nesting duck in the Klamath region. The Gadwall and Fulvous Tree-duck were found nesting at Los Baños only. The Redhead was found most abundant at Tule and White Lakes. Pintails and Cinnamon Teal were found to nest more commonly in the Sacramento and San Joaquin valleys than in the Klamath region. A difference in the numbers of the various shore-birds was also noted. The following table of censuses taken at the several localities visited will give some idea of the relative abundance of the species of ducks, geese and shore-birds met with. With the ducks, actual counts were made. The numbers of shorebirds are estimates based on memory. The censuses are taken from my notebook, and the circumstance that no birds of a species were recorded as seen does not mean that they did not exist in the region, but simply that they were not seen on the days the counts were made.

COMPARATIVE NUMBERS OF DUCKS, GEESE AND SHOREBIRDS
AS SHOWN BY TYPICAL CENSUSES

Locality	Mallard	Pintail	Redhead	Gadwall	Cinnamon Teal	Shoveller	Tree-duck	Ruddy Duck	Canada Goose	Killdeer	Avocet	Stilt	Coot
Los Baños, Merced Co., Calif.....	..	..	10	1	19	6	2	4	..	24	2	30	20
Gridley, Butte Co., Calif.....	11	2	..	..	2	2	..	..	..	..	..	6	4
Link River, Klamath Co., Ore.....	40	4	30	..	25	..	..	6	..	10	6	15	1
Tule Lake, Ore. and Calif.....	13	..	17	..	16	2	..	2	..	14	12	..	2
White Lake, Ore. and Calif.....	21	..	28	..	2	..	..	..	..	8	14	..	2
Lower Klamath Lake near Brownell, Siskiyou Co., Calif.	40	..	2	..	4	..	..	2	1	6	2	..	2

Some idea of the distribution of nesting ducks as well as their success can be obtained from the following table which lists the number of broods of young of the different species seen at the chief breeding centers.

	Mallard	Pintail	Cinnamon Teal	Redhead	Canada Goose	Coot
Los Baños, Merced Co., Calif.....	2	3	5	..	..	5
Gridley, Butte Co., Calif.....	2	..	..	..	..	..
Klamath Lake region, Ore. and Calif.	5	..	2	1	4	2

In each locality marked preferences were shown among the different species for different types of nesting site. The plant associations represented and the species of ducks nesting in each may be listed as follows:

Grassy or sedge-covered margins of ponds
or islands Gadwall, Cinnamon Teal, Fulvous Tree-duck

Rush or tule thickets at margins of lakes,
ponds or sloughs Redhead, Mallard, Ruddy, Shoveller

Grass, grain or alfalfa fields at a distance Mallard, Pintail, Cinnamon Teal
from water

Sage or other brush in vicinity of water Mallard

The same sort of preference for particular associations was noted in connection with the shore-birds. Killdeer almost invariably chose the alkali flats or bare dry ground; Avocets were found to choose muddy or grassy islands or margins of ponds, whereas Stilts almost invariably chose the muddy islands or margins of ponds.

In explanation of this associational distribution I need but quote from Grinnell (Univ. Calif. Publ. Zool., 12, 1914, p. 96): ". . . associational restriction appears to be governed by the following three factors, of relative importance in the order named.

"1. Kind of food supply afforded, with regard to the inherent structural powers of each of the animals concerned to make it available.

"2. Presence of safe breeding-places, adapted to the varying needs of the animals, in other words, depending upon the respective inherent powers of construction, defense and concealment in each species concerned.

"3. Presence of places of temporary refuge for individuals, during day time or night time, or while foraging, when hard pressed by predatory enemies, again correlated with the respective inherent powers of defense and concealment of each species involved."

OUR NATIVE BREEDING STOCK OF DUCKS AS COMPARED WITH THE WINTER SUPPLY OF MIGRATORY DUCKS

The supply of ducks in California is derived from two seasonal categories of birds, one consisting of those which nest wholly to the north of us and come here only in the winter season, and the other, of those which nest here and either remain throughout the year within our borders or go farther south for the winter. Hunters depend at the beginning of the season chiefly upon the supply of native ducks and always maintain that these are the most desirable for the table. Home bred ducks are nearly all grain feeders and so lack the fishy taste so often found among the northern bred ducks. Numbered among the more desirable resident ducks are the Mallard, Pintail, Gadwall, Redhead and Cinnamon Teal. It is only the native contingent which we are in a position to control during the breeding season. The most important time for applying methods of conserving our duck supply therefore falls during spring and summer. It is a well-known fact that so long as game birds are unmolested on their breeding grounds they are best able to withstand a considerable toll each year. It thus becomes extremely desirable that California direct especial attention to the breeding grounds of the ducks which are strictly her own, and over which she exercises control at all seasons. If the native stock could be well conserved there would always be a supply which could be depended upon no matter what became of the winter birds. Our summer birds, too, are those likely to be seen and studied by the summer vacationist and which therefore give most pleasure to those people who do not hunt.

It is pre-eminently the duty of the State to conserve our native ducks, first, because they are highly desirable as food, second, because they are altogether our own and under our control, and third, because our native ducks are the ones available during the most favorable season for esthetic enjoyment by the people of the state.

SUCCESS AND FAILURE AMONG NESTING DUCKS

There are many factors which contribute to the success which attends

the nesting duck. Such a factor as weather is beyond our control. Others, such as predaceous animals, the market hunter, and encroachment of agriculture are within our control. At Los Baños we found that predaceous animals were destroying a very large percentage of ducks' nests. The following table will make clear how great the destruction really was.

	Pintail	Gadwall	Cinnamon	Fulvous	Coot	Killdeer
			Teal	Tree-duck		
Undestroyed nests.....	1	3	1	47	4	
Destroyed nests.....	3	3	18	2	2	1

In one locality where the water had lowered and allowed the approach of animals to what had been sedge-covered islets we found ten destroyed nests as a result of two hours searching. In most cases every egg had been broken into and the contents eaten. Of course the broken egg-shells made these destroyed



FIG. 70. RAIDED NEST OF PINTAIL, THE WORK OF SOME PREDACEOUS MAMMAL; LOS BAÑOS, MAY 24, 1914.

nests infinitely easier to find, so that the relative number of destroyed and undestroyed nests is doubtless somewhat exaggerated. Nevertheless, it clearly demonstrates the fact that large numbers of nests in this vicinity are destroyed by animals. In no other of the localities visited did we find a single nest which had been raided.

We experienced no difficulty in distinguishing nests destroyed by predaceous animals from those from which the eggs had hatched. In the former case the shells showed plain evidences of having been broken from the outside in, were usually more widely scattered about, and often contained a small part of the contents. Hatched eggs, on the other hand, had been fractured from the inside out and were usually broken up into small pieces or left in halves.

Time and again on returning to a nest to photograph it we were disap-

pointed to find that it had been destroyed. Let me cite several instances. We marked a Cinnamon Teal's nest containing five eggs and a Gadwall's nest containing nine eggs. On returning we found both of them raided and every egg destroyed. A Pintail's nest found one day, when examined the next morning was found to have been raided and all but four eggs destroyed (see fig. 70). On one occasion we found a Cinnamon Teal incubating three eggs, while around the nest there were evidences that several other eggs had been destroyed. On returning to the nest later we found that two other eggs had been removed and the bird had deserted her nest. A Fulvous Tree-duck's nest containing twelve eggs and well concealed on a weed-covered island was raided during our stay and every egg broken.

Our attempts to find out the particular species of animal doing the work proved unavailing. In most instances nests were placed in a growth of grass or sedge where no tracks were discernible. In other cases the soft mud at the bottom of the shallow water did not permit tracks to remain long in evidence. Raccoons were extremely common, and in some places near clumps of tules paths were found where their foot prints were plentiful. The fact that in some cases the animal had to wade through water to reach the nest which we found destroyed, also lends support to the theory that coons were largely responsible for the depredations. A number of weasels were seen during our stay, and coyotes were said to be common. It is possible that these two predaceous animals also took part in the destruction of nests.

Irrigation as practiced at Los Baños is also responsible for the destruction of many nests. Mr. Paul J. Fair, who has worked in this vicinity for some time, told me that he found many inundated nests. In some places the water was clear enough for him to see nests and eggs completely submerged a foot below the surface of the water. Dr. Frank M. Chapman, when visiting this locality in the summer of 1903, found similar conditions. He states: "Evidently the abnormal and sudden rise of the water, as well as the equally unusual fall, prevents many birds from rearing young. I found numbers of flooded nests in May, which had been built when the water was still rising, while disappearance must have been even more disastrous." Water is continually rising or lowering. The rising of the water floods the nests and the lowering allows the approach of predaceous animals to the nesting sites.

Still another factor is found in the large herds of cattle which are pastured here. We found two nests which had been trampled by cattle, and Mr. Fair tells me that he also found several nests which had been destroyed in like manner.

A rather remarkable state of affairs therefore exists in this locality. The nesting grounds were made available by the formation of pasture land out of originally arid plains, and yet the same factor, irrigation, instrumental in creating these excellent grounds, is responsible for the destruction of many nests.

The reclamation, even of swamp land, does not always entirely destroy the nesting grounds of ducks. A letter from Mr. Wm. N. Dirks dated May 18, 1914, records the discovery of two nests of Mallard, one of Pintail and five of Cinnamon Teal. These were uncovered while the grain was being mowed on a ranch at Alvarado, Alameda County, California. On Lower Klamath Lake we were told by a rancher that he had found several Mallard's nests in his rye field earlier in the season. Other ranchers told us that Mallards and Teal commonly nested in grain and alfalfa fields. It is certain, therefore, that some of our ducks adapt themselves to changed conditions.

If the added area of available breeding grounds provided through extended irrigation of land does not remain equal to the area of land rendered unfit for nesting it is evident that our breeding ducks must either adapt themselves to the new conditions or disappear. Not only are ducks strong lovers of their home locality but they are often prevented from taking up new quarters by the concentration of the numbers of their kind elsewhere. Hence it seems reasonable to believe that when nesting grounds are destroyed, and the ducks do not adapt themselves to new conditions, the numbers must certainly decrease. If this be true the need of furnishing safe breeding places for native ducks is imperative.

The Los Baños country is conceded to embrace the best of the breeding grounds of central California. It seems, therefore, that some measures might well be taken to prevent the destruction of nests above noted. A more careful regulation of the water during the height of the breeding season would interfere very little with the pasturage and would save many ducks. The encouragement of trapping might reduce the predaceous animals to such an extent that their depredations would be of little importance. The present prices on skins of fur-bearing animals is sufficient to pay for their capture. Even the hiring of one man to supervise this particular district during the breeding season would doubtless bring excellent returns. He could trap predaceous animals himself, could interest others in doing the same at the proper season, and could no doubt find means of reducing the destruction consequent upon the rise and fall of the water.

Obviously any methods which can be applied during the nesting season and which will insure a greater percentage of successes in rearing young will add just that much more to the annual yield. The visit to the Klamath Lake Bird Reservation clearly demonstrated that it is possible to maintain safe breeding places. I should say that the ducks in this vicinity were at least 75 per cent more successful than those at Los Baños. One of the first things noted on the preserve was the fearlessness of the birds. A person could easily approach within a few yards of them. As the government allows trappers to catch fur-bearing mammals on the Reservation these enemies are kept down to a minimum. Conditions are as near the natural as can be imagined, and the birds apparently profit immensely by this circumstance.

As an object of sport the duck has a value in dollars and cents. By the time the gun-club man pays for his trip, ammunition, entertainment, etc., he usually pays more than two dollars apiece for the ducks he shoots. Add to this value the pleasure the wild duck affords the man who does not shoot and it will be readily seen that a valuation of two dollars a head is not too high. As wild game belongs to the people as a whole, such a valuation emphasizes the importance of the state and federal government taking just as active interest in preserving this as any other natural resource such as forests or water supply. There is no reason why the mature crop of ducks should not be harvested yearly, just as the mature crop of timber is harvested. The same rational view as is accorded the administration of other natural resources needs to be applied here. Supervision of natural nesting grounds and even a considerable expenditure of money to secure and maintain additional breeding grounds as game refuges would, therefore, seem to be justified. More study in this direction will doubtless suggest other means by which our supply of native ducks can be increased.

One virtue of the gun club which in a measure offsets excessive shooting

during the open season is that it provides safe breeding grounds for many ducks. Much of the land owned by gun clubs would now be reclaimed and under cultivation had it not been appropriated for private game preserves. It is probable that most of our home birds are reared on the same grounds where they are later shot. This being true, it is incumbent upon the sportsmen of the state and others who shoot to see that excessive hunting does not reduce the supply of native ducks to the danger point. The necessary stock of breeding birds is even more important than available breeding grounds.

The continued reclamation of marsh lands is undoubtedly reducing the available nesting grounds. Nor is there hope that the swamping of land for pasturing cattle, or the forming of reservoirs for the storage of water will keep pace with the destruction of breeding grounds. Shooting during the open season is also yet too severe to allow of maintaining the proper breeding stock of native birds, and only a smaller bag limit will remedy this adverse feature. It is, therefore, imperative that steps be taken to not only provide suitable nesting grounds to take the place of those used up for agricultural purposes but also to cut down the annual toll enough so that we may maintain our native duck supply at a maximum productivity.

Berkeley, California, July 31, 1914.

A METHOD OF CLEANING SKULLS AND DISARTICULATED SKELETONS

By F. HARVEY HOLDEN

(Contribution from the University of California Museum of Vertebrate Zoology)

ALTHOUGH skins of birds and mammals have been preserved by museums and private collectors for many years, the saving of complete skeletons has, to a large extent, been neglected. Anyone engaged in intensive scientific research will realize that it is almost impossible to find representative skeletons in even the larger museums, while the private collector seldom if ever saves this part of his specimens which might prove invaluable if made available for study. Indeed, comprehensive osteological research on recent forms is, except in rare instances, impossible.

It requires no argument to show that this is a deplorable condition. The vertebrate paleontologist is, of necessity, an osteologist; yet his work is curtailed at every point because of the lack of descriptions of Recent material or access to such material itself. In taxonomic studies, also, many questions are unsettled upon which the study of the skeleton would throw important light.

One of the chief reasons for the lack of complete collections of skeletons of existing animals,—as complete as such collections might reasonably be expected to be,—is that it has been found both unpleasant and laborious to prepare the bones in shape for comparison or study. Either maceration has been employed, or the bones have been boiled in a solution of lye; the former requires several months for completion, while the latter process is injurious to the bones, and to the hands of the operator. It is hoped that once the greater part of the unpleasantness and labor has been eliminated, the study of osteology will take the place it should among other branches of zoology.

It is with a desire to aid those persons who are likely to interest themselves in this fascinating study, as well as to furnish an apparently new cleaning formula for museums, that the following description of a process of removing flesh from skulls and disarticulated skeletons, is offered.

During the past four years the process here described has been subjected to continual test, and has been proved free from all the objections raised to maceration or cooking in other solutions. It is impossible to eliminate all odor from dried or drying flesh, but the disagreeable stench from maceration tanks is avoided. The "chalking" of bones, as occurs at times with even the mildest alkali, is also eliminated; and, instead of the solution injuring the hands, it acts as a disinfectant and so prevents infection from the tissues handled. In fact, no objectionable results have been observed.

The speed with which skeletons and skulls may be cleaned is another argument for the adoption of this solution. As high as forty-four skulls (*Peromyscus*) have been completely cleaned in an hour, after the proper treatment, while twenty-five is an average rate. With skeletons of small birds and rodents, from ten to thirty can easily be cleaned in a single hour.

SOLUTION I

One part, by bulk, clean phenol or carbolic acid (liquid 90%, commercial)

Three parts clean ammonia (28% commercial)

Ten to fifty parts of clean water (varying in amount according to the degree to which the flesh has dried)

(Make up as needed for immediate use)

SOLUTION II

$\frac{1}{4}\%$ to $1\frac{1}{2}\%$ solution of hydrogen peroxide (commercial)

To clean disarticulated skeletons.—Taking a fresh carcass of a bird or mammal, leave the greater part of the flesh on the bones. Do not remove any of the flesh from ducks, rabbits or smaller animals, but carefully tear away the skin and remove the entrails. This lack of preliminary treatment is advisable because the processes and condyles are less likely to be broken after the meat has become tender. With geese, foxes, or larger animals, it may be found advantageous to remove the larger bodies of muscle, such as those found on the breast of the goose and along the back of the fox; but even in these cases the tongue and eyes should be left in place.

Place the skeleton in Solution I and stew (at almost the boiling point) until the meat is tender and can be detached from the bones readily. As *boiling* drives off the ammonia and phenol, it should be avoided; and even at a more gentle temperature the flesh should be watched and if it is found that the flesh becomes bleached, as a result of the action of carbolic acid alone, more ammonia should be added.

When the skeleton has been thoroughly cooked, pour the solution into another retainer, wash the bones in clear water, and place them on the fire again to simmer. This will remove the greater part of the ammonia and phenol which is in the meat and remove much of the dark color. Now remove most of the meat with the fingers and a scraper and place in Solution II. In this the bones should stew until those that are free from grease are of a clear ivory color. Now complete the cleaning by brushing and scraping, and place in the sun to dry.

With small skeletons of birds and mammals, a great number may be cooked at one time by placing the individual specimens in cloth bags. When this is done the first cleaning may be dispensed with, and it will be found that a

stream of water will clean the bones if they are first placed on a fine-meshed screen.

Notes.—Dry flesh requires less cooking than fresh. If practicable, dry before cooking. In shipping undried skeletons dry cornmeal, in quantity, will keep the meat from becoming putrescent.

Sheep, deer, and goat skeletons are so easily cleaned after cooking for considerable time in water alone that no solution should be used.

Cleaning skulls.—The individual age of the skulls, as well as the genus, has much to do with the length of time they should be stewed. The skull of an adult *Peromyscus* will not be injured by a process which would disarticulate the skull of a juvenile *Neotoma*. It is necessary, therefore, to group each genus by itself; and in one genus to separate the adults from the juveniles.

The next step should be the removal of the brains. This should always be done in the field while the skull is still fresh, as it can then be done with greatest ease and least danger of injuring the bones. If this has been neglected the skulls should be thoroughly soaked in warmed water and the brains removed with a bent wire or a small scraper (such as is figured in Hornaday's "Taxidermy"). A half ounce "infant rectal" syringe is also very useful. The nozzle should be filed down until it is thin-walled so that it may be inserted in the foramen magnum of a small skull. By holding the barrel of the syringe between the second and third fingers of the right hand, close to the palm, nozzle facing outward, and the ring of the plunger over the first joint of the thumb, one hand can operate the syringe while the other holds the skull under water. Care should be taken when water is forced into the brain-case, or the bones will be wrenched apart. If the brain is thoroughly softened and broken up, the greater part of it can be *sucked out*, instead of being forced out. If this is done there will be no danger of disarticulating the posterior portion of the skull. If the brains are not removed before cooking, they may expand and force the brain-case apart.

If each skull has a heavy, non-soluble tag attached, with the number or identifying mark written thereon with waterproof ink, many skulls may be cooked loose in one container. Higgins' Eternal Ink on imitation parchment paper has been used with success. Each group of skulls should be placed in separate, clean, unrusty granite-ware or aluminum pots and covered with Solution I. These should be cooked as directed for skeletons, trying several skulls at short intervals to observe progress. As soon as done, wash, cook in water, then in Solution II and finally clean.

All clinging flesh should be removed by using a bone scraper (not too large), a tooth brush (previously dampened to soften it), and the syringe. With the exception of the juvenile skulls, which can not be cooked so long, it will be found that the meat will become so softened as to be readily *sucked off* by using the syringe as directed for the brains.

Some experimenting may be found necessary in adopting this method, but it should not prove difficult to master, as these directions have been used in manuscript form by persons without previous experience or personal instruction.

This process has been employed in the osteological laboratory of the California Museum of Vertebrate Zoology for the past four years, and many thousands of skulls and many hundreds of skeletons have been prepared, all with uniformly satisfactory results.

University of California, August 7, 1914.

THE CONDOR

A Magazine of
Western Ornithology
Published Bi-Monthly by the
Cooper Ornithological Club

J. GRINNELL, Editor, Berkeley, California
HARRY S. SWARTH, Associate Editor
J. EUGENE LAW } Business Managers
W. LEE CHAMBERS }

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EDITORIAL NOTES AND NEWS

The proposition to expand the scope of THE CONDOR, as set forth in our last issue, aroused more interest than we had expected it to do. The straw vote has been responded to at a lively rate, and, as it stood on September 1, is two to one in favor of expansion. However, the tone of expression from the majority voters has been varyingly submissive, permissive or mildly approbatory, while that from the minority comes with vigor, rebuff and even threat of subsequent dire calamity! We had no notion of disrupting our present constituency, even if assured of increment membership to more than offset such defection. Therefore, though regretfully, we hasten to cover with our little scheme, and hereby declare that its consideration in relation to THE CONDOR will be given no further thought by the present Editor. So let our magazine continue on its feathered career unblemished with glint of fur or scales!

The day has come when the collector must take special pains to justify himself in the eyes of the increasingly many who are not inclined to countenance bird-destruction for any purpose whatsoever. Whatever the merits in this extreme attitude, collectors have the situation to face. Undoubtedly the "scientific specimen" argu-

ment is the strongest to be offered. In this connection it does look as though the collector might make more exhaustive use of the birds he kills. To save a well made skin, with accurate color notes, measurements, etc., is good. To save also the stomach, for economic record, is so much more use made of the bird. One long step still farther is to save the skeleton, or whatever portion of it remains when the skin is made up. And this need not now, with a knowledge of lately discovered methods, be the disagreeable, time-consuming task it once was. We would refer the collector to Mr. Holden's valuable article in the present issue, not only for an explanation of the simple processes involved, but for a statement of the urgent scientific need for preserving skeletons of birds.

PUBLICATIONS REVIEWED

THE BIRDS ON BUENA VISTA LAKE, SOUTHERN CALIFORNIA. By WM. SHORE BAILY. (*Bird Notes*, n. s., v, Feb., 1914, pp. 51-57, 2 half-tone ill.; *id.*, Mar., 1914, pp. 79-83, 1 half-tone ill.)

The attention of the reviewer was called to the article here commented upon through Mr. Stone's exhaustive and valuable current index to "Recent Literature" in *The Auk* (vol. 31, July, 1914, p. 427). The reader inkers with probable correctness that an English travelling sportsman is here relating some of his experiences abroad, and has dashed down his story with little or no regard for accuracy of form. Severe criticism is deserved on the score of nomenclature alone, for neither the author, nor the editor of *Bird Notes*, has apparently taken the least pains to secure correct determinations. The bird names employed almost throughout the article seem to be taken directly from European literature, just as if California birds had as yet secured no recognition in ornithology. Even so, there are inexcusable blunders in regard to relationships. The nature of the case will be understood from the following selections.

"As the sun rose, revealing my presence in the shadow of land, flocks of Gulls took wing, principally Herring, and Black-backed (identical with our English birds)"; "a few Black-winged Stilts (*Himantopus candidus*) allowed me to get very close"; "Moorhens, mostly in pairs, beat a leisurely retreat"; "a pair of Greenshanks were feeding on a near by mud-bank"; "Bronze Ibis"; "a large flock of small waders" . . . "proved to be Curlew-Sandpipers (*Tringa subarquata*), a little bird I had previously met with in the Isle of Man"; "a mixed flock of Curlew and Whimbrel" . . . included "the Eskimo species (*Numenius borealis*), but the Whimbrels were similar to our European birds"; "Harrier"; "Iceland Falcon"; etc. We are thus presented with about the sort of product a California tourist in Eng-

land might put out, if armed only with our A. O. U. *Check-List*!

From a technical standpoint the publication of the article was a mistake. Historically it might have been of some value, if dates had been given. The vague expression "some few years ago" is hardly sufficient for determining the date of the conditions described. The poor typography and faulty grammar also are annoying.

With all these faults, there yet remain some features which can be commended. It is not difficult, by perusing closely the context, and upon a basis of a knowledge of the species already known to occur on Buena Vista Lake, to interpret nearly every reference with fair confidence into American terminology.

The narrative is interesting and probably very close to the truth as regards the habits and relative numbers of the species encountered. Some life-history notes of decided value are to be dug out of the text here and there by judicious effort. Adequate care in the formalities would have resulted in a distinctly useful product. Unfortunately similar cases are of not rare occurrence nearer home.—J. GRINNELL.

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

JUNE.—The regular meeting of the Southern Division was held at the Museum of History, Science, and Art, Thursday evening, June 25, 1914. President Law was in the chair, and the following members were present: Mrs. Frances M. Harmon, and Messrs. Colburn, Cookman, Daggett, Huey, Law, Rich, Robertson, Snyder, Stivers, Swarth, Wood, Wyman, and Zahn. Visitors present were Mr. C. O. Reis, and Dr. John G. Sheaffer.

The minutes of the May meeting were read and approved, and the Northern Division minutes for May were also read. New members elected were: Miss Charlotte Bowditch, Santa Barbara, and Dr. Irwin D. Nokes, Los Angeles. A motion was also passed electing to membership those individuals whose names were accepted at the last Northern Division meeting. New names were presented as follows: F. C. Holman, Palo Alto, proposed by Joseph Malliard; and the following, all proposed by W. Lee Chambers: Harry Harris, Kansas City, Mo.; J. Alden Loring, Owego, N. Y.; Mrs. E. C. T. Miller, Cleveland, O.; Ronald K. Brown, New York; Lionel S. Dear, Fort William, Ontario, Canada; Wm. Purdy Shannon, New York; Jules Labarthe,

Thompson, Nevada; E. S. Cameron, Marsh, Montana; Horace W. Wright, Boston, Mass.

A letter was read from the secretary of the Pacific Division of the American Association for the Advancement of Science, inviting the Southern Division of the Cooper Ornithological Club to participate in a meeting of the Association to be held in San Francisco in August, 1915. Mr. Law was appointed a committee of one, to attend to this matter as well as to any other details arising in connection with the Southern Division's relations to the Association.

A motion was passed authorizing the secretary to supply the secretary of the Pacific Division of the A. A. S. with Cooper Club letter-heads, for a circular letter to be sent out by the Association to the members of the Club.

A motion was made and passed, creating a committee on arrangements, to attend to affairs in connection with the Southern Division's participation in the joint A. O. U. and Cooper Club meeting to be held in 1915. Mr. Law was made chairman, he to appoint two others to assist him, their names to be announced at a later date.

Mr. Huey spoke briefly about some of his collecting experiences of the last few weeks, among other things describing certain peculiar conditions observed among the water birds breeding at Buena Vista Lake. Adjourned.—H. S. SWARTH, *Secretary*.

JULY.—The regular monthly meeting of the Southern Division was held at the Museum of History, Science, and Art, Los Angeles, Thursday evening, July 30, 1914. President Law was in the chair, and the following members were present: Messrs. Chambers, Colburn, Daggett, Edwards, Nokes, Rich, Robertson, Swarth, Welch, Wood, and Wyman. Mr. F. Barker was a visitor. The minutes of the previous meeting were read and approved, and the Northern Division minutes for June and July were also read. New members were elected as follows: F. C. Holman, Palo Alto; Harry Harris, Kansas City, Missouri; J. Alden Loring, Owego, New York; Mrs. E. C. T. Miller, Berkeley; Ronald K. Brown, New York; Lionel S. Dear, Fort William, Ontario, Canada; Wm. Purdy Shannon, New York; Jules Labarthe, Thompson, Nevada; E. S. Cameron, Marsh, Montana; Horace W. Wright, Boston, Massachusetts. A motion was also passed admitting to membership those individuals elected at the last Northern Division meeting.

The following new names were presented: Carl D. Hegner, Los Angeles, proposed by H. A. Edwards; John G. Sheaffer,

Los Angeles, by H. S. Swarth; Mrs. Edward Gay Butler, Berryville, Virginia, by H. H. Bailey; W. E. Boering, Seattle, Washington, by C. K. Knickerbocker; Robert W. Williams, Takoma Park, Maryland, by T. S. Palmer; Mrs. Marie Andrews Commons, Crystal Bay, Minnesota, by T. S. Roberts; R. Bruce Horsfall, Princeton, New Jersey, by Alex. Walker; Frederick Adam, Tropico, and D. I. Simmons, Los Angeles, both presented by A. E. Colburn; and the following presented by W. Lee Chambers: Mrs. Herbert Brown, Tucson, Arizona; Dr. R. L. Walker, Carnegie, Pennsylvania; George S. Shiras 3rd, Washington, D. C.; C. F. Hodge, Eugene, Oregon; Dr. Winsor M. Tyler, Lexington, Massachusetts; John P. Young, Youngstown, Ohio; Edwin B. Hunt, Washington, D. C.; Horace G. Smith, Denver, Colorado; Fred Barker, Parkers Prairie, Minnesota; and Mrs. Harriet Brown Thornber, Tucson, Arizona.

At the suggestion of Mr. Law the committee on arrangements for the joint American Ornithologists' Union and Cooper Club meeting to be held next year, was increased to five. The personnel of this committee will be announced later by Mr. Law, the chairman.

There was considerable discussion over the suggestion recently submitted by the editor of *THE CONDOR*, that the magazine hereafter publish matter pertaining to other branches of zoology besides ornithology, but no formal action was taken by the Division at this time.

Messrs. Law, Wyman, Colburn, and Nokes displayed a number of beautifully made skins, recently collected, of many local species of birds in the younger stages. Downy young of several species of water birds, and the juvenal plumages of some of the rarer land birds were included. Adjourned.—H. S. SWARTH, *Secretary*.

NORTHERN DIVISION

JUNE.—The regular monthly meeting of the Northern Division was held at the Museum of Vertebrate Zoology, Berkeley, California, Thursday evening, June 18, 1914, with President Bryant in the chair and the following members present: Mrs. Grinnell, Messrs. Evermann, Grinnell, J. Maillard, Storer, W. P. Taylor and Trenor. Messrs. Martens and McDonald were visitors. The minutes of the Northern Division for May were read and approved followed by the reading of the Southern Division minutes for May. The following were elected to membership: Edward E. Armstrong, J. Howard Richey, and Ernest Schaeffle. New

names proposed were as follows: Miss Charlotte Bowditch of Santa Barbara by W. Lee Chambers and Dr. Irwin D. Nokes of Los Angeles by A. E. Colburn.

It was moved, seconded and carried that a committee of three be appointed by the President to consider the proposed constitution of the Pacific Division of the American Association for the Advancement of Science and to report at the July meeting.

A letter from Mr. A. L. Barrows was read asking that the Cooper Club furnish the Pacific Division of the A. A. A. S. with sufficient stationery to send a circular letter to the members of the Club who are not yet members of the American Association offering them membership in the latter association without the necessity of paying the regular \$5.00 initiation fee. The matter was referred to the officers of the Division with power to act.

Dr. H. C. Bryant then addressed the Division on "The Status of California's Duck Population in 1914". The address covered the experiences of Dr. Bryant and his assistant in a recent trip to the more important duck breeding grounds in California and the southern lake region of Oregon. Adjourned.—TRACY I. STORER, *Secretary*.

JULY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held in Room 101, California Hall, Friday evening, July 17, 1914. The meeting was open to the public.

President Bryant presided and introduced as speaker of the evening, Dr. Walter P. Taylor, Chairman of the Permanent Committee on the Conservation of Wild Life, who spoke on the subject of "Our Vanishing Wild Life". About three hundred persons were present as visitors, the meeting having been extensively advertised. The lecture was illustrated with lantern slides.

A short business session was held at the close of the lecture to consider some applications. Those present were: Messrs. Bryant, Carriger, Evermann, Grinnell, Schaeffle, Storer and Taylor. The following were elected to membership: Miss Charlotte Bowditch and Dr. Irwin D. Nokes. New names were proposed as follows: Dr. George Bird Grinnell, 238 East 15th St., New York City; Enos A. Mills, Longs Peak, Estes Park, Colorado, and Elizabeth J. Worcester (Mrs. Alfred Worcester), Bacon St., Waltham, Mass., all proposed by J. Grinnell; and Miss Minnette MacKay, 2420 Channing Way, Berkeley, California, proposed by Tracy I. Storer.

Adjourned.—TRACY I. STORER, *Secretary*.

For Sale, Exchange and Want Column.—In this space members of the Cooper Club are allowed one notice in each issue free of charge. Books and magazines can be offered for sale or exchange; bird skins and eggs can be offered in exchange, but *not for sale*. For this department address W. LEE CHAMBERS, *Eagle Rock, Los Angeles County, California*.

FOR SALE.—Bendire's *Life Histories*, perfect condition: one volume, original cloth, one-half red russia, marbled top. Very rare; listed everywhere at \$16, or more; Thirteen Dollars, net.—P. B. PEABODY, *Blue Rapids, Kansas*.

WANTED.—Living, healthy birds of the following species for aviary: Rose-breasted Grosbeak, Eastern and Western Evening Grosbeaks, Eastern and California Pine Grosbeaks, Eastern and Western Blue Grosbeaks, and Pyrrhuloxias. Expenses attendant upon capture of these birds, and fair remuneration, will be paid. Write in advance in regard to state permits. Correspond with:—F. W. HENSHAW, *Redwood City, San Mateo County, California*.

I WANT one copy each of "The Blue Bird", vol. 6, nos. 1 and 2, published at Cincinnati, Ohio; edited by Dr. Eugene Swope.—W. LEE CHAMBERS, *Eagle Rock, Los Angeles County, California*.

WANTED.—Living or freshly shot specimens of Screech Owls, or other California owls, for scientific use. Arrangements for permit must be made with the undersigned before taking specimens. Address:—PROFESSOR C. A. KOFOLD, *Department of Zoology, University of California, Berkeley, California*.

OVERFLOW list of your duplicates wanted as follows: Random Notes on Nat. Hist. I, 2, 3; II, 12; III, 5, 6, 10, 11. Oregon Naturalist [=Naturalist, Oregon City] I, 12 (Nov.-Dec., 1894). Field and Forest I, 5, 6; II, 5, 6, 7; III, 3, 4, 6, 9, 10, 11, 12. Parts or volumes of these: Amer. Osprey, Ky. Bittern, Canisteo, N. Y.; Canadian Sportsman and Naturalist; Collectors Monthly; Forest and Field, N. Y.; Hawkeye O. & O.; Hoosier Nat.; Hummer; Loon; Maine O. & O.; Naturalist & Tax.; Observer I, 4, and Audubon Magazine II, 2.—DR. BRAISLIN, 556 *Washington Ave., Brooklyn, N. Y.*

WANTED.—Osprey, Vol. I, no. 2. Will pay any reasonable price for a copy to complete my files. Also want *Auk*, vols. 1 to 6 and 19, and copies of Journ. Me. Orn. Soc., and Bull. Mich. Orn. Club.—DR. T. W. RICHARDS, *U. S. Navy, 1207 19th. St., N. W., Washington, D. C.*

WANTED.—Nidologist, vol. I, nos. 1, 2, 5, 8; vol. II, 11; Osprey, vol. III, 7.—O. WIDMANU, 5105 *Von Versen Ave., St. Louis, Mo.*

FOR SALE.—Complete file of Bird-Lore, first 14 volumes; first eight years bound in two volumes; well bound, plain cloth \$42.50. Also odd copies of Bird-Lore, vol. 2, nos. 5, 6; vol. 3, nos. 1, 2, 3, 5; vol. 6, no. 6; vol. 7, no. 6; vol. 8, nos. 1, 2, 3, 4, 6; vol. 9, complete; vol. 10, complete; vol. 10, no. 5; vol. 11, complete; vol. 12, complete; vol. 12, no. 6.—ALICE PARK, 611 *Gilman St., Palo Alto, Calif.*

FOR SALE.—The following periodicals at the price opposite each: *The Observer*, Jan. and Sept., 1892, one dollar each; May, 1893, 75 cents; vol. v, (1894) complete, six dollars; single copies, January and June, 1894, 75 cents each; vol. vi, 1895, Mar. and Dec. nos. missing, three dollars; vol. vii, 1896, Feb., Apr., May, June, July, Aug., Sept., Oct. nos., two dollars or 25 cents each. *Ornith. and Oologist*, Mar., Apr., May, May 15, June, July, Aug., Sept., Oct., Nov., Dec., 1882, one dollar each, and same, vol. viii, Feb.-July inclusive (1883), one dollar each. *Aquila*, vol. xx, 1913, 585 pp., plates, \$2.00. All in excellent condition.—R. W. SHUFELDT, 3356 *18th St., Washington, D. C.*

FOR SALE.—Twelve-gauge breech-loader, good condition, with 32-ga. auxiliary; some tools and shells. Five Dollars cash, Fifteen Dollars exchange, net.—P. B. PEABODY, *Blue Rapids, Kansas*.

FOR SALE.—Nidologist, vol. II, \$1.50; III, \$2.00; IV, \$1.50. All new in parts as issued. This is one of the early publications in which Cooper Club papers were published.—W. LEE CHAMBERS, *Eagle Rock, Los Angeles County, California*.

WANTED.—Copies of any of the following publications. Nidologist, vol. 1, no. 2, Oct., 1893; Osprey, N. S., 1902, March, April and July; Oologist, May and December, 1897, April and September, 1899; Wilson Bull., no. 4, 1894. B. H. SWALES, *Grosse Isle, Mich.*

WANTED.—Number 3 of Vol. 1 The Bulletin of the Cooper Ornithological Club; will pay cash, also exchange bird skins for eggs, or eggs for eggs; particularly interested in Eagles' eggs from anywhere.—L. BROOKS, 130 *School St., New Bedford, Mass.*

WANTED.—Loomis's *Water Birds of California*, I to V inc. Particularly want no. V. Will pay cash or give good exchange. Also want Wilson Bulletin, nos. 1 to 75.—O. P. SILIMAN, *Castroville, Calif.*

BIRDS---NESTS---EGGS

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